

**ExxonMobil Refining & Supply Company**  
Global Remediation

3700 West 190th Street, TPT #2-7  
Torrance, California 90504  
(310) 212-3727 Office  
(310) 212-1890 Facsimile  
marla.d.guensler@exxonmobil.com

Marla D. Guensler  
Global Remediation  
Territory Manager

**ExxonMobil**  
*Refining & Supply*

March 4, 2005

Mr. Noman Chowdhury  
California Regional Water Quality Control Board  
Los Angeles Region  
320 West 4th Street, Suite 200  
Los Angeles, California 90013

**Subject: Interim Remedial Action Plan**  
Mobil Station 18MLJ  
5005 North Long Beach Boulevard  
Long Beach, California  
CRWQCB File No. 908050452A

Mr. Chowdhury:

Enclosed for review is a copy of the interim remedial action plan (IRAP) for the above-referenced site. The scope of work contained in the IRAP is to install four air sparging/soil vapor extraction (AS/SVE) wells on site and conduct an AS/SVE test. The purpose of this interim remedial action is to remove fuel constituents from the saturated and vadose zones, and obtain engineering data to determine whether or not AS/SVE is a viable remediation technique for this site. ExxonMobil Oil Corporation's consultant, Environmental Resolutions, Inc. (ERI), prepared this IRAP.

Please call the undersigned at (310) 212-3727 for any questions regarding the content of this IRAP.

Sincerely,



Marla D. Guensler  
Project Manager

**Attachment: Interim Remedial Action Plan, Mobil Station 18MLJ, 5005 North Long Beach Boulevard, Long Beach, California, prepared by ERI.**

- C: w/ attachment:  
Ms. Carmen Piro, City of Long Beach Department of Health and Human Services
- C: w/o attachment:  
Mr. George E. Salley, ERI

March 4, 2005

Ms. Marla D. Guensler  
ExxonMobil Oil Corporation  
3700 West 190<sup>th</sup> Street, TPT #2-7  
Torrance, California 90504

**Subject: Interim Remedial Action Plan**  
Mobil Station 18MLJ  
5005 North Long Beach Boulevard  
Long Beach, California  
CRWQCB File No. 908050452A

Ms. Guensler:

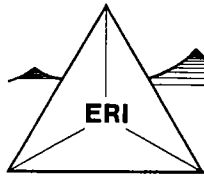
Enclosed is the interim remedial action plan (IRAP) for an air sparge/soil vapor extraction feasibility study at the above-referenced site. Environmental Resolutions, Inc. (ERI) recommends that a copy of this IRAP be sent to Mr. Noman Chowdhury at the California Regional Water Quality Control Board – Los Angeles Region.

Please call ERI at (949) 457-8954 for any questions regarding the contents of this IRAP.

Sincerely,  
Environmental Resolutions, Inc.

George E. Salley  
Senior Project Geologist  
P.G. 6308

Enc: ERI 316305.W03  
Transmittal Letter



**ENVIRONMENTAL RESOLUTIONS, INC.**

March 4, 2005

Ms. Marla D. Guensler  
ExxonMobil Oil Corporation  
3700 West 190<sup>th</sup> Street, TPT #2-7  
Torrance, California 90504

**Subject: Interim Remedial Action Plan**  
Mobil Station 18MLJ  
5005 North Long Beach Boulevard  
Long Beach, California  
CRWQCB File No. 908050452A

Ms. Guensler:

At the request of ExxonMobil Oil Corporation (ExxonMobil), Environmental Resolutions, Inc. (ERI) has prepared this interim remedial action plan (IRAP) for an air sparge/soil vapor extraction (AS/SVE) feasibility study at the above-referenced site (Site Location Map, Plate 1). The proposed feasibility study will consist of installing four AS/SVE wells and performing an AS/SVE test. The purpose of this investigation will be to determine whether or not AS/SVE is a viable remedial option for the abatement of fuel constituents in the soil and groundwater beneath the site.

This IRAP is organized as follows:

- **Site Description** – Provides a brief description of the site and the surrounding area.
- **Background** – Summarizes past activities conducted at the site and provides references that may be used for a more detailed review.
- **Proposed Work** – Provides the justification for the proposed feasibility study and discusses the site-specific conditions and activities.
- **Laboratory Analysis** – Outlines laboratory information and methods to be used to analyze soil and soil vapor samples collected during the proposed investigation.
- **Report** – Identifies that a technical report will be provided.

## **SITE DESCRIPTION**

The subject site is an active Mobil service station which sells Mobil-brand gasoline, located at the northwestern corner of North Long Beach Boulevard and Del Amo Boulevard in Long Beach, California (Plate 1). The site facilities consist of a service station building containing a Mobil Mart food store. The fueling system consists of three unleaded-gasoline underground storage tanks (USTs), one diesel UST, seven fuel dispensers (six gasoline and one diesel) and the associated product piping. The site facilities are shown on the Generalized Site Plan (Plate 2). The area surrounding the site consists of commercial businesses, apartments and residential housing. A Chevron service station is located on the southwestern corner of the intersection across Del Amo Boulevard. A Shell service station is located on the southeastern corner. A 7-Eleven food store and a McDonald's restaurant are located on the northeastern corner.

## **BACKGROUND**

This section briefly summarizes previous activities conducted at the site. For more detailed information, refer to the documents listed in the reference section of this IRAP. The locations of soil samplings and existing groundwater monitoring wells are shown on Plate 2. Soil analytical results from previous investigations are summarized in Table 1, and cumulative water level measurements and groundwater analyses are presented in Table 2.

In August 1989, American Environmental Management Corporation (AEM) conducted a site assessment that consisted of drilling and sampling six soil borings, and completing three of the soil borings as groundwater monitoring wells (AEM, 1989). The results of this investigation prompted the City of Long Beach Department of Health and Human Services to transfer the case to the California Regional Water Quality Control Board (CRWQCB) for further review and oversight. The case was transferred on October 4, 1989, and the CRWQCB issued case file #908050452 to this site. Subsequent to the transfer of this case to the CRWQCB, additional site assessment and remedial testing activities were performed at the site which resulted in the installation of nine groundwater monitoring wells (five on site and four off site), three on-site air sparge wells and two on-site vapor extraction wells. Quarterly groundwater monitoring was conducted at the site from first quarter 1993 through second quarter 1996 (TRAK Environmental Group, 1996). During this time period, depth to groundwater ranged from approximately 27 to 36 feet below ground surface (bgs), and the groundwater flow direction was consistently toward the southwest. On July 23, 1996, the CRWQCB issued an Underground Storage Tank Case Closure Letter, and required that all wells be properly destroyed. On November 11, 1996, Remedial Management Corporation (RMC) submitted a well abandonment report stating that all of the wells (on site and off site) had been abandoned by pressure grouting (RMC, 1996).

In January 2001, H.B. Covey of Pomona, California, conducted a fueling system upgrade at the site. The upgrade consisted of removing and replacing the fuel dispensers and related product piping. FREY Environmental, Inc. (FREY) of Newport Beach, California, performed soil sampling activities in conjunction with the fueling system upgrade. FREY personnel collected soil samples from six locations adjacent to the fuel dispensers and from one location adjacent to the product piping. (FREY, 2001)

In August 2002, ExxonMobil named ERI as the environmental consultant for this site. In April 2003, ERI conducted an initial site assessment which consisted of drilling and sampling soil borings B1 through B3. Borings B1 and B2 were completed as groundwater monitoring wells MW1 and MW2, respectively. Boring B3 was completed as dual-completion groundwater monitoring/soil vapor extraction well MW3. The soil boring locations were based on the analytical results obtained by FREY during the fueling system upgrade in 2001. During ERI's investigation it was determined that the subsurface consists of fine-grained soil to a depth of approximately 20 feet bgs, at which point the soil becomes coarse-grained and remains so to the maximum depth drilled of 51.5 feet bgs. The highest concentrations of fuel constituents in the vadose zone were detected in borings B2 and B3 during this investigation. Groundwater was first encountered at approximately 30 feet bgs. Upon completion of the initial site assessment, ERI placed this site into the ExxonMobil quarterly groundwater monitoring and sampling program. (ERI, 2003)

In a letter to Mr. Greg Kwey of the CRWQCB dated September 22, 2003, the Joint Powers Agency – Long Beach/Signal Hill referred the regulatory oversight for this case to the CRWQCB. On December 2, 2003, ExxonMobil received a letter from the CRWQCB assigning the case number for this site and requesting additional information, including a record of the current fee title holder. ERI, on behalf of ExxonMobil, provided the requested information to the CRWQCB in a letter dated December 17, 2003.

In an effort to move this site toward regulatory case closure, ExxonMobil authorized ERI to prepare a work plan to assess for the presence of fuel constituents off site in the direction of groundwater flow. ERI submitted a work plan to the CRWQCB dated August 6, 2004 proposing the installation of three off-site groundwater monitoring wells. ERI invoked the 60-day rule regarding the work plan, and in October 2004 conducted an additional investigation to assess the condition of soil and groundwater off site to the south and southwest. The assessment consisted of drilling and sampling soil borings B4 through B6, and completing the borings as groundwater monitoring wells MW4 through MW6, respectively. The analytical results from soil sampling during this investigation confirmed that the vadose zone off site in the direction of groundwater flow had been largely unaffected by fuel constituents. During this investigation, groundwater was encountered at approximately 30 feet bgs. The initial results from groundwater sampling indicated that groundwater in the off-site wells contained detectable concentrations of certain fuel constituents. The newly installed wells were placed into the existing quarterly groundwater monitoring and sampling program. (ERI, 2004)

Quarterly groundwater monitoring and sampling has been conducted at the site since the second quarter 2003. During that time, the average depth to groundwater at the site has been approximately 29 feet bgs, and groundwater flow direction has been toward the southwest.

## **PROPOSED WORK**

The purpose of the proposed feasibility study is to evaluate the use of AS/SVE as a viable remediation method for the removal of fuel constituents from the saturated and vadose zones beneath this site. In order to conduct the feasibility study, ERI proposes to install four AS/SVE wells and perform an AS/SVE test. The proposed locations of the AS/SVE wells are shown on Plate 2. The results of the study will be used to: 1) determine the air sparge radius of influence (ROI) and the soil vapor extraction ROI; and 2) evaluate the amount of fuel constituents that could be removed by the continuous operation of an AS/SVE system.

All fieldwork will be performed in accordance with a site safety plan (SSP) which will be available on site during all field activities. A copy of the SSP is included in Appendix A. The fieldwork will be conducted under the supervision of a State of California professional geologist. Drilling, soil sampling, well installation and waste disposal activities will be conducted in accordance with ERI's field protocol for AS/SVE well installation, a copy of which is included in Appendix B.

### **Preliminary Activities**

Prior to drilling, well construction permits will be obtained from the Los Angeles County Department of Health Services. Underground Services Alert, the CRWQCB, the property owner and the service station manager will be properly notified. The proposed well locations will be checked for buried utilities by a private geophysical surveyor and cleared for buried utilities using air excavation tools prior to drilling.

### **Proposed AS/SVE Well Locations**

The proposed locations of the AS/SVE wells are shown on Plate 2. The proposed locations and spacing of the AS/SVE wells represent points that will provide the necessary engineering data during the AS/SVE test to calculate both soil vapor extraction ROI and air sparge ROI. The proposed locations are placed in the area of the site from which the highest concentrations of fuel constituents were detected during previous assessment activities conducted by ERI.

### **AS/SVE Well Construction**

The AS/SVE wells will be constructed by installing an air sparge well and two SVE wells in the same borehole. The air sparge well will be constructed by coupling a 3-foot long, 1.25-inch diameter, 60 mesh stainless steel well point to a 1-inch diameter, schedule 80 polyvinyl chloride (PVC) riser set from approximately 43 feet to 6 inches bgs. This places the bottom of the steel well point at a depth that is approximately 13 feet below the

average annual static groundwater level. The SVE wells will be constructed with 2-inch diameter, schedule 40 PVC casing. The screened intervals of the SVE wells will be constructed with sections of factory slotted, 2-inch diameter 0.020-inch screened casing. The shallow SVE well will be screened from approximately 17 to 7 feet bgs to mitigate fuel constituents from the zone of fine-grained soil (silt and clay) that exists to an average depth of 20 feet bgs. The deep SVE well will be screened from approximately 31 to 21 feet bgs to mitigate fuel constituents from the zone of coarse-grained soil (sand) that exists below 20 feet bgs. Above the screened interval of each SVE well, blank 2-inch diameter casing will be set to approximately 6 inches bgs. All casing joints will be flush-threaded and no glues, chemicals or solvents will be used in well construction. The annular spaces of the wells will be completed as shown on the Proposed AS/SVE Well Construction Diagram (Plate 3). The AS/SVE wells will be surface completed with traffic-rated well vaults and secured in place with concrete.

### **AS/SVE Test**

Based on the soil and groundwater analytical results obtained from the previous investigations and quarterly monitoring and sampling conducted at the site, ERI recommends that a mobile thermal-oxidizing vapor extraction treatment unit and an air compressor be used to conduct the AS/SVE test. In order to evaluate the effectiveness of AS/SVE as a remediation technology, the test will be performed in three phases. Phase 1 will be conducted to determine the soil vapor extraction ROI for both the shallow (fine-grained) zone and the deep (coarse-grained) zone. Phase 2 will be conducted to determine the induced pressure ROI from air sparging. During Phase 3, ERI will conduct simultaneous AS/SVE to evaluate the amount of fuel constituents that could be removed during full system operation.

It is not anticipated that groundwater will be removed from the wells during the test. However, if groundwater is recovered, it will be routed via hose to a polyurethane tank for temporary storage and subsequent transportation to an ExxonMobil-approved recycling facility. Soil vapor removed during the test will be treated by the thermal oxidizer on the mobile treatment unit.

### **Phase 1**

Phase 1 will consist of two single-well tests. The deep zone will be tested first, followed by the shallow zone. During this phase of the test, ERI proposes to utilize newly installed well AS/SVE1 for soil vapor extraction. Newly installed wells AS/SVE2 through AS/SVE4 and well B3/MW3 will be used as observation wells. During each interval of Phase 1, vacuum will be applied to only one of the SVE casings (deep followed by shallow) of well AS/SVE1. Induced vacuums will be recorded from the observation wells. After each interval of Phase 1, the extraction and observation wells will be uncapped and allowed to vent until the negative pressure induced in the subsurface has returned to pre-test levels.

Prior to starting Phase 1, ERI will perform the following tasks:

1. Connect the chosen extraction well to the treatment unit.
2. Measure static groundwater levels from select site wells.
3. Measure the distances from each observation well to the extraction well, and install magnehelic gauges on the observation wells.
4. Install magnehelic gauges at the influent to the treatment unit and at the extraction well to measure vacuum in inches of water (in. H<sub>2</sub>O).
5. Install the proper gauge between the treatment unit and the extraction well to measure flow in standard cubic feet per minute (scfm).
6. Install a sample port between the treatment unit and the extraction well to sample the influent vapor stream.

During Phase 1, ERI will perform the following tasks:

1. Check and change magnehelic gauges as needed to obtain readings in each gauge's scale range.
2. Record the following values:
  - Influent soil vapor concentrations to the treatment unit
  - Vacuum readings at the extraction well
  - Vacuum readings at each observation well
  - Flow readings at the treatment unit
  - Vacuum readings at the influent to the treatment unit
3. Collect samples (a minimum of two per interval) from the influent vapor stream to the treatment unit.

## Phase 2

Phase 2 of the test will be performed by connecting the air sparge casing of well AS/SVE1 to an oil-less air compressor. Wells AS/SVE2 through AS/SVE4 and select groundwater monitoring wells will be used as observation wells during this phase of the test. The test will be started at 5 pounds per square inch (psi) of induced pressure and incrementally increased by 5 psi until 30 psi are reached or until a flow rate of 10 scfm can be sustained.

Prior to starting Phase 2, ERI will perform the following tasks:

1. Measure static groundwater levels from select site wells.
2. Measure dissolved oxygen levels in select site wells.
3. Connect the chosen air sparge well to the oil-less air compressor.
4. Measure the distances from each observation well to the air sparge well.
5. Install magnehelic gauges at the air sparge well and observation wells to measure pressure in in. H<sub>2</sub>O.

During Phase 2, ERI will perform the following tasks:



1. Check and change magnehelic gauges as needed to obtain readings in each gauge's scale range.
2. Record the following values:
  - Groundwater levels at select site wells
  - Pressure readings at the air sparge well
  - Positive induced pressure readings at each observation well
  - Flow readings at the air compressor
3. At the completion of the test, measure dissolved oxygen levels in each of the wells that were gauged prior to the start of the test.

### Phase 3

The purpose of Phase 3 is to measure the fuel constituent concentrations in the influent vapor stream to the mobile treatment system while air sparging and soil vapor extraction are operated concurrently. The data obtained can be utilized to evaluate the amount of fuel constituents that could be removed by the continuous operation of an AS/SVE system. This phase will be conducted until influent fuel constituent concentrations have stabilized.

Prior to starting Phase 3, ERI will perform the following tasks:

1. Connect the SVE wells to a manifold in order to provide individual well control as necessary during this portion of the test.
2. Connect the AS wells to a manifold in order to provide individual well control as necessary during this portion of the test.
3. Install a flow meter at the treatment unit to measure total flow in scfm.
4. Install a sample port between the manifold and treatment unit to sample the influent vapor stream.
5. Install a sample port at each of the chosen extraction wells to sample soil vapors at each wellhead.

During Phase 3, ERI will perform the following tasks:

1. Record the following values:
  - Influent soil vapor concentrations to the treatment unit
  - Soil vapor concentrations at each extraction well
  - Positive pressure and flow readings at the air compressor
  - Vacuum and flow readings at the treatment unit
2. Collect soil vapor samples from the influent vapor stream to the treatment system at the beginning, middle, and end of the test.

### **LABORATORY ANALYSIS**

ERI will utilize an ExxonMobil-approved, state-certified laboratory to analyze the samples collected during this feasibility study. The soil samples collected during the installation of the AS/SVE wells will be analyzed for

total petroleum hydrocarbons as gasoline (TPHg) by Environmental Protection Agency (EPA) Method 8015B, and for benzene, toluene, ethylbenzene, total xylenes (BTEX) and fuel oxygenates by EPA Method 8260B. Fuel oxygenates to be analyzed include methyl tertiary butyl ether, di-isopropyl ether, ethyl tertiary butyl ether, tertiary amyl methyl ether, tertiary butyl alcohol and ethanol. The soil vapor samples will be analyzed for TPHg by EPA Method TO-3(M) and for BTEX and the aforementioned fuel constituents by EPA Method TO-15M.

## **REPORT**

After the completion of the field activities, a report summarizing field procedures and the results of the feasibility study will be submitted to ExxonMobil and the CRWQCB. The report will also include AS/SVE well construction details, boring logs and laboratory reports. A State of California professional geologist will sign the report.

March 4, 2005

For any questions regarding this IRAP, please call Mr. George E. Salley of ERI at (949) 457-8954.

Sincerely,

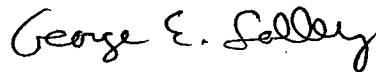
Environmental Resolutions, Inc.



Michael J. Mednick

Branch Manager

R.E.A. 05425



George E. Salley

Senior Project Geologist

P.G. 6308

Enclosures:

- |            |  |
|------------|--|
| Plate 1    | Site Location Map  |
| Plate 2    | Generalized Site Plan  |
| Plate 3    | Proposed AS/SVE Well Construction Diagram                    |
| Table 1    | Previous Soil Analytical Results                             |
| Table 2    | Cumulative Water Level Measurements and Groundwater Analyses |
| Appendix A | Site Safety Plan   |
| Appendix B | Field Protocol   |

## REFERENCES

American Environmental Management, August 1989, Site Assessment, Mobil Station, 5005 Long Beach Boulevard, Long Beach, California.

California Regional Water Quality Control Board – Los Angeles Region, July 23, 1996, Underground Storage Tank Case Closure, Mobil Service Station 18-MLJ, 5005 Long Beach Boulevard, Long Beach.

Environmental Resolutions, Inc., June 9, 2003, Letter Report for the Installation of Three Groundwater Monitoring Wells at Mobil Station 18-MLJ, 5005 North Long Beach Boulevard, Long Beach, California.

Environmental Resolutions, Inc., December 23, 2004, Groundwater Monitoring Well Installation Report, Mobil Station 18MLJ, 5005 North Long Beach Boulevard, Long Beach, California.

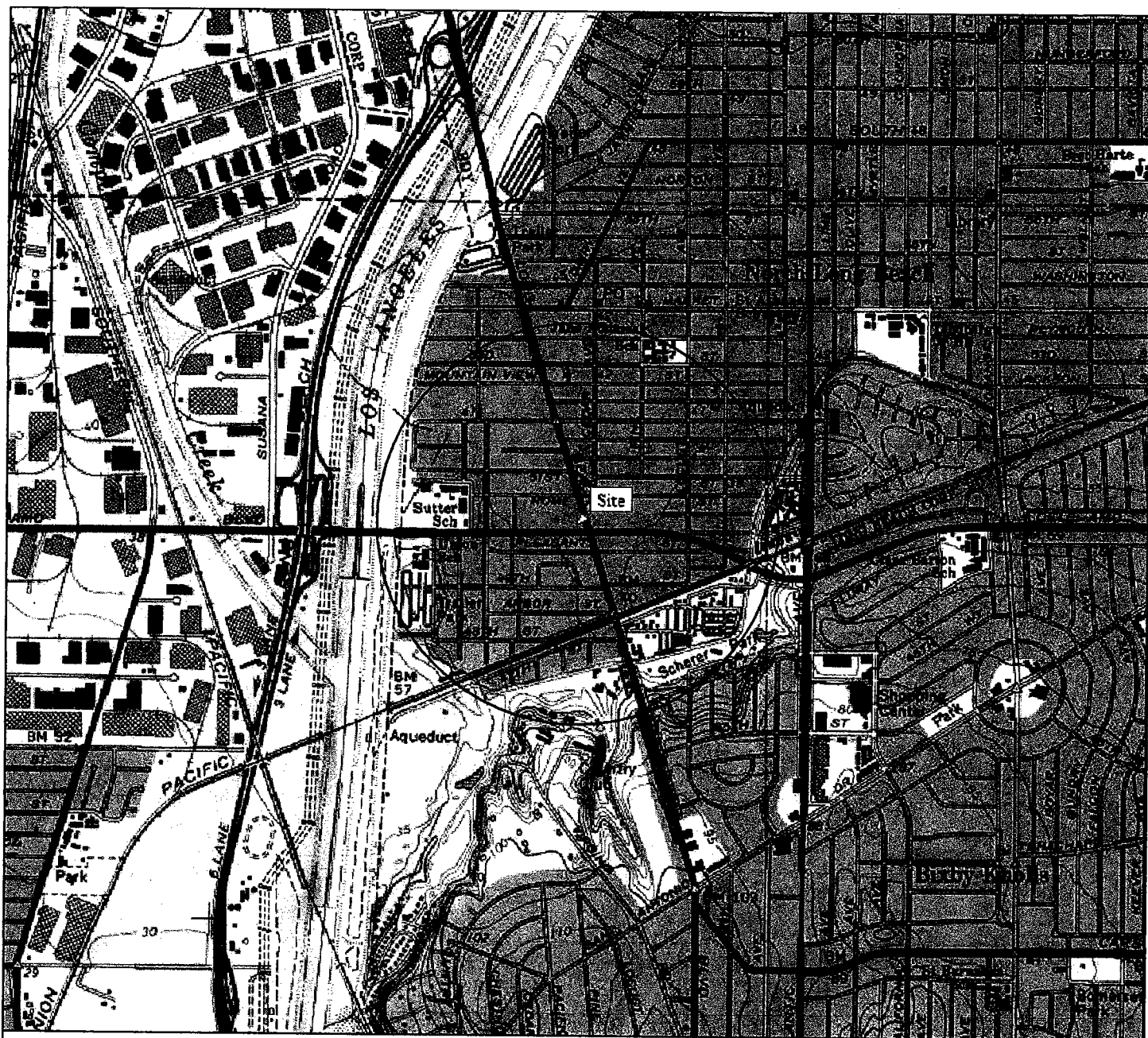
Environmental Resolutions, Inc., January 15, 2005, Quarterly Report for the Fourth Quarter 2004, Mobil Station 18MLJ, 5005 North Long Beach Boulevard, Long Beach, California.

FREY Environmental, Inc., March 19, 2001, Fuel Dispensing Complex Soil Sampling, Mobil Service Station #18-MLJ, 5005 N. Long Beach Boulevard, Long Beach, California.

Remedial Management Corporation, November 11, 1996, Abandonment of Groundwater Monitoring, Sparge, and Vapor Extraction Wells, Mobil Station 11-MLJ, 5005 Long Beach Boulevard, Long Beach, California.

TRAK Environmental Group, Inc., July 25, 1996, Quarterly Progress Report, Second Quarter 1996, Mobil Service Station 11-MLJ, 5005 Long Beach Boulevard, Long Beach, California.

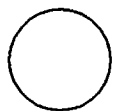
United States Geological Survey, 1964 (photorevised 1981), Long Beach, California, Quadrangle 7.5 Minute Series Topographic Map.



Printed from TOPO! 82001 National Geographic Holdings (www.topo.com)

FN 3163TOP0

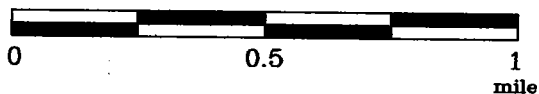
## EXPLANATION



1/2-mile radius circle



## APPROXIMATE SCALE



SOURCE:  
Modified from a map  
provided by  
National Geographic's TOPO!



## SITE LOCATION MAP

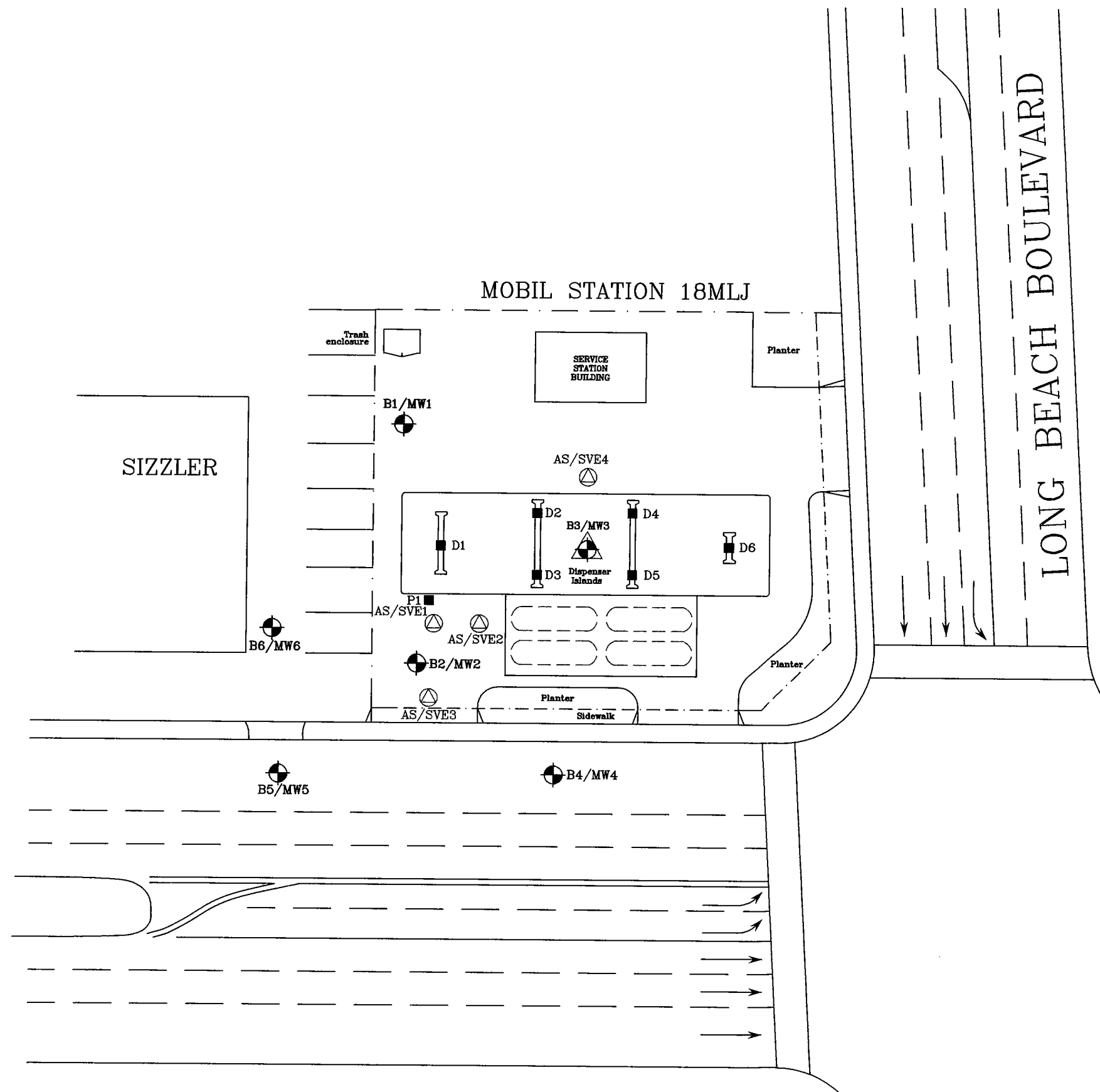
MOBIL STATION 18MLJ  
5005 North Long Beach Boulevard  
Long Beach, California

PROJECT NO.






3163

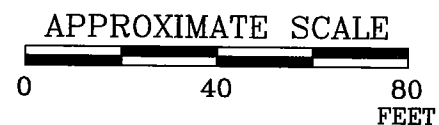
PLATE

1



# EXPLANATION

-  B6/MW6 Groundwater monitoring well
-  B3/MW3 Groundwater monitoring/vadose zone well
-  D6 Soil sample location (FREY Environmental, 1991)
-  AS/SVE4 Proposed air sparge/soil vapor extraction well
-  Underground storage tank



## GENERALIZED SITE PLAN

MOBIL STATION 18MLJ  
5005 North Long Beach Boulevard  
Long Beach, California

FN 31630004



PROJECT NO.

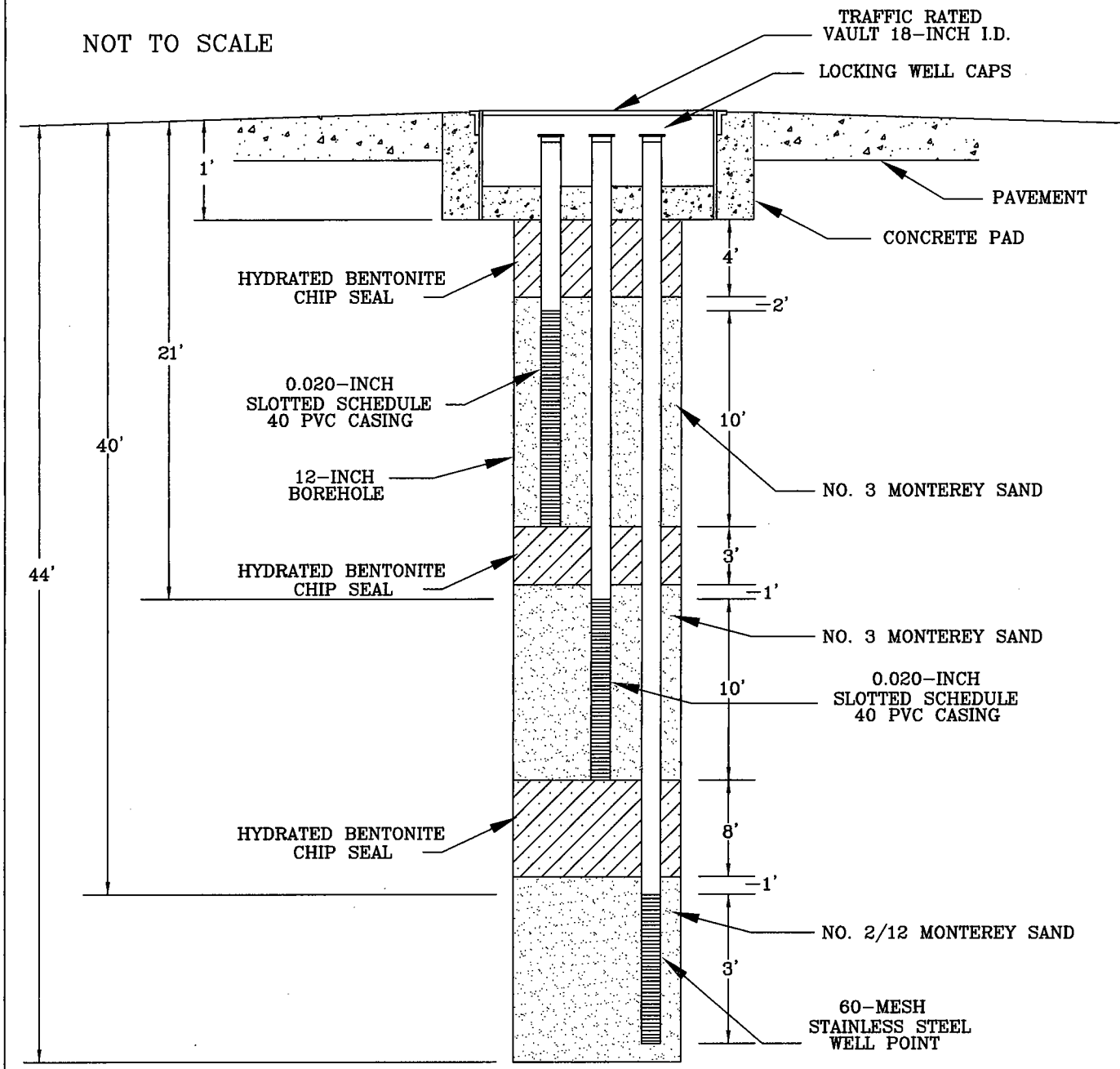
3163

PLATE

2

DATE: 02/23/05

NOT TO SCALE



FN 3163TCW



Date: 02/14/05

PROJECT

3163

# **PROPOSED AS/SVE WELL CONSTRUCTION DIAGRAM**

MOBIL STATION 18MLJ  
5005 North Long Beach Boulevard  
Long Beach, California

PLATE

3

**TABLE 1**  
**PREVIOUS SOIL ANALYTICAL RESULTS**  
**MOBIL STATION 18MLJ**  
**5005 NORTH LONG BEACH BOULEVARD**  
**LONG BEACH, CALIFORNIA**  
**ERI 3163**

Sample Number	Depth (feet)	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHg	TPHd	MTBE	TBA	DIPE	ETBE	TAME	Ethanol	Methanol
Samples collected by FREY Environmental, Inc. on January 18 and 29, 2001. Concentrations reported in mg/kg.														
D1-4	4	<0.092	<0.092	<0.092	<0.272	1.1	NA	5.000	2.600 J	<0.092	<0.092	<0.092	NA	NA
D2-4	4	<0.110	<0.110	<0.110	<0.330	1.9	NA	5.500	21.000	<0.110	<0.110	<0.110	NA	NA
D3-4	4	<0.100	<0.100	<0.100	<0.310	34	NA	30.000	140	<0.100	<0.100	0.055 J	NA	NA
D4-4	4	<0.096	<0.096	<0.096	<0.286	0.82	NA	4.800	8.900	<0.096	<0.096	<0.096	NA	NA
D5-4	4	<0.94	<0.94	<0.94	<0.284	53	NA	50.000	69.000	<0.94	<0.94	<0.94	NA	NA
D6-4	4	<0.390	0.270 J	<0.390	0.210 J	1.8	NA	18.000	<19.000	<0.390	<0.390	<0.390	NA	NA
P1-4	4	<0.930	<0.930	<0.930	<2.830	2.1	NA	13.000	<46.000	<0.930	<0.930	<0.930	NA	NA
SP1		<0.0050	<0.0050	<0.0050	<0.010	<0.50	NA	0.017	4.000	<0.010	<0.010	<0.010	NA	NA
SP2		<0.0050	0.0062	0.010	0.177	3.8	NA	0.011	0.610	<0.010	<0.010	<0.010	NA	NA
SP3		<0.0050	<0.0050	<0.0050	<0.0100	<0.50	NA	<0.0050	0.900	<0.010	<0.010	<0.010	NA	NA
SP4		<0.0050	<0.0050	<0.0050	<0.0100	<0.50	NA	0.049	1.700	<0.010	<0.010	<0.010	NA	NA
SP5		<0.0050	<0.0050	<0.0050	0.054	<0.50	NA	0.039	3.500	<0.010	<0.010	<0.010	NA	NA
SP6 (a)		<0.0050	<0.0050	<0.0050	<0.0100	<0.50	NA	<0.0050	0.510	<0.010	<0.010	<0.010	NA	NA
SP7 (a)		<0.0050	<0.0050	<0.0050	<0.0100	<0.50	NA	<0.0050	<0.250	<0.010	<0.010	<0.010	NA	NA
Samples collected by Environmental Resolutions, Inc. on April 14 and 15, 2003. BTEX and fuel oxygenate concentrations reported in µg/kg; TPHg, ethanol and methanol reported in mg/kg.														
S-6-B1	6	0.78 J	0.71 J	<0.98	0.49 J	<0.27	NA	0.28 J	<20	<0.98	<0.98	<0.98	<0.10	<0.10
S-10-B1	10	11	11	1.7	2.57 J	<0.23	NA	<1.9	<19	<0.95	<0.95	<0.95	<0.10	<0.10
S-15-B1	15	0.46 J	<0.89	<0.89	<2.69	<0.25	NA	0.54 J	<18	<0.89	<0.89	<0.89	<0.10	<0.10
S-20-B1	20	<0.84	<0.84	<0.84	<2.54	<0.21	NA	<1.7	<17	<0.84	<0.84	<0.84	<0.10	<0.10
S-25-B1	25	<1.0	<1.0	<1.0	<3.1	<0.24	NA	<2.1	<21	<1.0	<1.0	<1.0	<0.10	<0.10
S-30-B1	30	<0.97	<0.97	<0.97	<2.87	0.12 J	NA	0.28 J	<19	<0.97	<0.97	<0.97	<0.10	<0.10
S-40-B1	40	0.72 J	0.53 J	<0.91	<2.71	0.26	NA	<1.8	<18	<0.91	<0.91	<0.91	<0.10	<0.10
S-50-B1	50	<1.1	<1.1	<1.1	<3.2	0.13 J	NA	<2.1	<21	<1.1	<1.1	<1.1	<0.10	<0.10



**TABLE 1**  
**PREVIOUS SOIL ANALYTICAL RESULTS**  
**MOBIL STATION 18MLJ**  
**5005 NORTH LONG BEACH BOULEVARD**  
**LONG BEACH, CALIFORNIA**  
**ERI 3163**

Sample Number	Depth (feet)	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHg	TPHd	MTBE	TBA	DIPE	ETBE	TAME	Ethanol	Methanol
Samples collected by Environmental Resolutions, Inc. on April 14 and 15, 2003 (continued). <b>BTEX and fuel oxygenate concentrations reported in µg/kg; TPHg, ethanol and methanol reported in mg/kg.</b>														
S-5-B2	5	<98	<98	<98	<298	<0.24	NA	1300	<2000	<98	<98	<98	<0.10	<0.10
S-10-B2	10	<88	<88	<88	<268	<0.23	NA	2600	<1800	<88	<88	<88	<0.10	<0.10
S-15-B2	15	<88	<88	<88	<268	0.070 J	NA	1000	<1800	<88	<88	<88	<0.10	<0.10
S-20-B2	20	3.1	<0.87	11	3.85	0.15 J	NA	36	13 J	<0.87	<0.87	<0.87	<0.10	<0.10
S-25-B2	25	1.0	<0.98	6.4	<2.98	0.17 J	NA	700	220	<0.98	<0.98	<0.98	<0.10	<0.10
S-30-B2	30	<98	<98	<98	<298	0.13 J	NA	1300	<2000	<98	<98	<98	<0.10	<0.10
S-35-B2	35	<1.0	0.42 J	<1.0	0.27 J	0.083 J	NA	1.8 J	<20	<1.0	<1.0	<1.0	<0.10	<0.10
S-40-B2	40	0.16 J	0.38 J	4.9	1.61 J	0.15 J	NA	1.3 J	<20	<0.99	<0.99	<0.99	<0.10	<0.10
S-45-B2	45	<95	2100	620	3600	83	NA	39 J	<1900	<95	<95	<95	<0.10	<0.10
S-50-B2	50	<370	45000	16000	92000	1300	NA	<740	<7400	<370	<370	<370	<0.10	<0.10
S-10-B3	10	<190	<190	<190	212 J	0.68	NA	21000	<3700	<190	<190	<190	<0.10	<0.10
S-15-B3	15	37 J	220	1000	8600	4.4	NA	6700	<1800	<90	<90	<90	<0.10	<0.10
S-20-B3	20	2.7	0.35 J	90	140.95	2.4	NA	720	23	<0.82	<0.82	<0.82	<0.10	<0.10
S-25-B3	25	0.60 J	0.45 J	6.3	20.1	0.12 J	NA	270	56	<0.92	<0.92	<0.92	<0.10	<0.10
S-30-B3	30	<0.97	<0.97	0.35 J	1.63 J	0.22	NA	5.9	<19	<0.97	<0.97	<0.97	<0.10	<0.10
S-35-B3	35	<110	<107	78 J	500	1.1	NA	1300	<2100	<110	<110	<110	NA	NA
S-45-B3	45	0.48 J	2.0	12	85	0.79	NA	150 J	45	<0.89	<0.89	<0.89	<0.10	<0.10
S-50-B3	50	0.35 J	1.5	10	71	0.46	NA	300	58	<0.87	<0.87	<0.87	<0.10	<0.10
Samples collected by Environmental Resolutions, Inc. on October 26 through 28, 2004. <b>Concentrations reported in mg/kg.</b>														
S-10-B4	10	0.0044	0.0039	<0.0013	<0.0013	<5.00	<10.1	<0.0013	<0.0321	<0.0013	<0.0013	<0.0013	<0.128	<10.0
S-15-B4	15	<0.0015	<0.0015	<0.0015	<0.0015	<5.00	<9.96	<0.0015	<0.0378	<0.0015	<0.0015	<0.0015	<0.151	<10.0
S-20-B4	20	<0.0011	<0.0011	<0.0011	<0.0011	<5.00	<10.1	<0.0011	<0.0274	<0.0011	<0.0011	<0.0011	<0.109	<10.0
S-25-B4	25	<0.0019	<0.0019	<0.0019	<0.0019	<5.00	<9.88	<0.0019	<0.0468	<0.0019	<0.0019	<0.0019	<0.187	29.8
S-30-B4	30	<0.0014	<0.0014	<0.0014	<0.0014	<5.00	<10.1	<0.0014	<0.0358	<0.0014	<0.0014	<0.0014	<0.143	25.1
S-35-B4	35	<0.0013	<0.0013	<0.0013	<0.0013	<5.00	<10.1	<0.0013	<0.0319	<0.0013	<0.0013	<0.0013	<0.128	<10.0
S-40-B4	40	<0.0012	<0.0012	<0.0012	<0.0012	<5.00	<10.0	<0.0012	<0.0303	<0.0012	<0.0012	<0.0012	<0.121	51.3
S-45-B4	45	<0.0014	<0.0014	<0.0014	<0.0014	<5.00	<9.88	<0.0014	<0.0356	<0.0014	<0.0014	<0.0014	<0.142	<10.0
S-50-B4	50	<0.0010	<0.0010	<0.0010	<0.0010	<5.00	<10.0	<0.0010	<0.0256	<0.0010	<0.0010	<0.0010	<0.102	<10.0
S-10-B5	10	0.0035	0.0027	0.0031	0.0148	<5.00	<10.1	<0.0013	<0.0333	<0.0013	<0.0013	<0.0013	<0.133	<10.0
S-15-B5	15	<0.0013	<0.0013	<0.0013	<0.0013	<5.00	<10.0	<0.0013	<0.0325	<0.0013	<0.0013	<0.0013	<0.130	<10.0
S-20-B5	20	0.0018	<0.0016	<0.0016	0.0026	<5.00	<9.88	<0.0016	<0.0399	<0.0016	<0.0016	<0.0016	<0.159	<10.0
S-25-B5	25	<0.0023	<0.0023	<0.0023	<0.0023	<5.00	<10.0	<0.0023	<0.0576	<0.0023	<0.0023	<0.0023	<0.230	199
S-30-B5	30	<0.0012	<0.0012	<0.0012	<0.0012	<5.00	<9.88	<0.0012	<0.0292	<0.0012	<0.0012	<0.0012	<0.117	17.3
S-35-B5	35	<0.0012	<0.0012	<0.0012	<0.0012	<5.00	<10.1	<0.0012	<0.0302	<0.0012	<0.0012	<0.0012	<0.121	<10.0

**TABLE 1**  
**PREVIOUS SOIL ANALYTICAL RESULTS**  
**MOBIL STATION 18MLJ**  
**5005 NORTH LONG BEACH BOULEVARD**  
**LONG BEACH, CALIFORNIA**  
**ERI 3163**

Sample Number	Depth (feet)	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHg	TPHd	MTBE	TBA	DIPE	ETBE	TAME	Ethanol	Methanol
Samples collected by Environmental Resolutions, Inc. on October 26 through 28, 2004 (continued). Concentrations reported in mg/kg.														
S-45-B5	45	<0.0016	0.0028	0.0073	0.0103	<5.00	<10.0	<0.0016	<0.0394	<0.0016	<0.0016	<0.0016	<0.158	57.0
S-50-B5	50	<0.0011	0.0131	0.0349	0.0558	<5.00	<9.92	<0.0011	<0.0278	<0.0011	<0.0011	<0.0011	<0.111	<10.0
S-10-B6	10	0.0058	0.0048	<0.0016	<0.0016	<5.00	<10.0	<0.0016	<0.0388	<0.0016	<0.0016	<0.0016	<0.155	<10.0
S-15-B6	15	<0.0015	<0.0015	<0.0015	<0.0015	<5.00	<9.80	<0.0015	<0.0382	<0.0015	<0.0015	<0.0015	<0.153	<10.0
S-20-B6	20	<0.0014	<0.0014	<0.0014	<0.0014	<5.00	<10.1	<0.0014	<0.0362	<0.0014	<0.0014	<0.0014	<0.145	<10.0
S-25-B6	25	<0.0014	<0.0014	<0.0014	<0.0014	<5.00	<10.1	<0.0014	<0.0344	<0.0014	<0.0014	<0.0014	<0.138	49.8
S-30-B6	30	<0.0013	<0.0013	<0.0013	<0.0013	<5.00	<10.1	<0.0013	<0.0334	<0.0013	<0.0013	<0.0013	<0.134	<10.0
S-35-B6	35	0.0023	0.0015	<0.0014	<0.0014	<5.00	<10.0	<0.0014	<0.0353	<0.0014	<0.0014	<0.0014	<0.141	<10.0
S-40-B6	40	<0.0012	<0.0012	<0.0012	<0.0012	<5.00	<10.1	<0.0012	<0.0312	<0.0012	<0.0012	<0.0012	<0.125	<10.0
S-45-B6	45	<0.0013	<0.0013	0.112	0.0608	<5.00	<10.1	<0.0013	<0.0318	<0.0013	<0.0013	<0.0013	<0.127	<10.0
S-50-B6	50	<0.0013	<0.0013	0.0930	0.0486	<5.00	<9.92	<0.0013	<0.0325	<0.0013	<0.0013	<0.0013	<0.130	<10.0

**EXPLANATION:**

mg/kg = milligrams per kilogram;

µg/kg = micrograms per kilogram

BTEX = benzene, toluene, ethylbenzene and total xylenes

DIPE = di-isopropyl ether

ETBE = ethyl tertiary butyl ether

MTBE = methyl tertiary butyl ether analyzed by Environmental Protection Agency Method 8260B

TAME = tertiary amyl methyl ether

TBA = tertiary butyl alcohol

TPHd = total petroleum hydrocarbons as diesel

TPHg = total petroleum hydrocarbons as gasoline

(a) = samples analyzed for total lead; results were: SP6, 8.27 mg/kg; SP7, 13.2 mg/kg

D = dispenser island; P = product line; SP = stockpile

J = estimated value between method detection limit and practical quantification limit

NA = not analyzed

<7400 = not detected at or above stated laboratory reporting limit

**TABLE 2**  
**CUMULATIVE WATER LEVEL MEASUREMENTS AND GROUNDWATER ANALYSES**  
**MOBIL STATION 18MLJ**  
**5005 NORTH LONG BEACH BOULEVARD**  
**LONG BEACH, CALIFORNIA**  
**ERI 3163**

<i>Date</i>	<i>Well Elev</i>	<i>GW Depth</i>	<i>GW Elev</i>	<i>LPH</i>	<i>Benzene (ug/l)</i>	<i>Toluene (ug/l)</i>	<i>Ethyl- benzene (ug/l)</i>	<i>Xylenes (ug/l)</i>	<i>TPHg (ug/l)</i>	<i>TPHd (ug/l)</i>	<i>TRPH (ug/l)</i>	<i>MTBE (ug/l)</i>	<i>DIPE (ug/l)</i>	<i>ETBE (ug/l)</i>	<i>TAME (ug/l)</i>	<i>TBA (ug/l)</i>	<i>Ethanol (ug/l)</i>	<i>Methanol (ug/l)</i>
<b>Field Point</b>	<b>MW1</b>																	
4/17/2003	41.10	29.66	11.44	no	<1.00	<1.00	<1.00	<1.00	230	133	<100	<2.00	<1.00	<1.00	<1.00	<10.0	<1000	<10000
8/26/2003	41.10	29.52	11.58	no	<1.00	<1.00	<1.00	<1.00	97.4	<500		<2.00	<1.00	<1.00	<1.00	<10.0	<1000	<10000
11/14/2003	41.10	29.88	11.22	no	<1.00	<1.00	<1.00	<1.00	<50.0	<500		<2.00	<1.00	<1.00	<1.00	<10.0		
2/21/2004	41.10	30.03	11.07	no	<1.00	<1.00	<1.00	<1.00	<50.0	<500		<2.00	<1.00	<1.00	<1.00	<10.0	<1000	<10000
4/30/2004	41.10	29.85	11.25	no	<1.00	<1.00	<1.00	<1.00	<50.0	<500		<2.00	<1.00	<1.00	<1.00	69.0		
7/10/2004	41.10	30.50	10.60	no	<1.00	<1.00	<1.00	<1.00	231	<500		2.90	<1.00	<1.00	<1.00	<10.0		
11/5/2004	41.10	30.52	10.58	no	<1.00	<1.00	<1.00	<1.00	<50.0	<500		<2.00	<1.00	<1.00	<1.00	<10.0		
<b>Field Point</b>	<b>MW2</b>																	
4/17/2003	39.55	28.43	11.12	no	5.90	3660	1340	3940	19900	2980	<100	131	<1.00	<1.00	<1.00	<10.0	<1000	<10000
8/26/2003	39.55	28.31	11.24	no	118	1220	1260	625	15600	1490		5200	<1.00	<1.00	5.70	85.1	<1000	<10000
11/14/2003	39.55	28.66	10.89	no	68.0	1280	1280	770	9810	1110		4260	<1.00	<1.00	<1.00	142		
2/21/2004	39.55	28.82	10.73	no	47.1	560	1220	775	10600	1710		975	<1.00	<1.00	<1.00	56.5	<1000	<10000
4/30/2004	39.55	28.62	10.93	no	61.0	424	1390	550	9090	872		1040	<1.00	<1.00	<1.00	<10.0		
7/10/2004	39.55	29.34	10.21	no	60.4	348	1260	402	8260	1220		920	<1.00	<1.00	<1.00	125		
11/5/2004	39.55	29.31	10.24	no	66.7	238	930	190	6360	878		220	<1.00	<1.00	<1.00	<10.0		
<b>Field Point</b>	<b>MW3</b>																	
4/17/2003	40.84	29.34	11.50	no	<1.00	<1.00	1.50	7.70	2530	916	<100	105	<1.00	<1.00	<1.00	45.4	<1000	<10000
8/26/2003	40.84	29.26	11.58	no	<1.00	<1.00	1.60	<1.00	162	<500		112	<1.00	<1.00	<1.00	<10.0	<1000	<10000
11/14/2003	40.84	29.57	11.27	no	<1.00	<1.00	2.40	<1.00	179	<500		87.2	<1.00	<1.00	<1.00	<10.0		
2/21/2004	40.84	29.73	11.11	no	1.20	<1.00	2.30	<1.00	170	<500		116	<1.00	<1.00	<1.00	<10.0	<1000	<10000
4/30/2004	40.84	29.57	11.27	no	<1.00	<1.00	2.00	6.40	138	<500		137	<1.00	<1.00	<1.00	<10.0		
7/10/2004	40.84	30.31	10.53	no	<1.00	<1.00	2.80	<1.00	139	<500		89.6	<1.00	<1.00	<1.00	<10.0		
11/5/2004	40.84	30.25	10.59	no	1.50	<1.00	4.30	<1.00	181	<500		182	<1.00	<1.00	<1.00	50.3		

TABLE 2  
CUMULATIVE WATER LEVEL MEASUREMENTS AND GROUNDWATER ANALYSES  
MOBIL STATION 18MLJ  
5005 NORTH LONG BEACH BOULEVARD  
LONG BEACH, CALIFORNIA  
ERI 3163

Date	Well Elev	GW Depth	GW Elev	LPH	Benzene (ug/l)	Toluene (ug/l)	Ethyl- benzene (ug/l)	Xylenes (ug/l)	TPHg (ug/l)	TPHd (ug/l)	TRPH (ug/l)	MTBE (ug/l)	DIPE (ug/l)	ETBE (ug/l)	TAME (ug/l)	TBA (ug/l)	Ethanol (ug/l)	Methanol (ug/l)
<b>Field Point</b>	<b>MW4</b>																	
11/5/2004	39.10	30.85	8.25	no	23.7	<1.00	<1.00	<1.00	247	<500		27.1	<1.00	<1.00	<1.00	5760		
<b>Field Point</b>	<b>MW5</b>																	
11/5/2004	38.72	28.74	9.98	no	<1.00	119	280	900	6520	1330		<2.00	<1.00	<1.00	<1.00	<10.0		
<b>Field Point</b>	<b>MW6</b>																	
11/5/2004	39.21	29.11	10.10	no	3.50	5.00	1120	404	8090	1580		<2.00	<1.00	<1.00	<1.00	<10.0		
<b>Field Point</b>	<b>Trip Blank</b>																	
4/17/2003				no	<1.00	<1.00	<1.00	<1.00	<50.0			<2.00	<1.00	<1.00	<1.00	<10.0	<1000	<10000
8/26/2003				no	<1.00	<1.00	<1.00	<1.00	<50.0			<2.00	<1.00	<1.00	<1.00	<10.0		
11/14/2003				no	<1.00	<1.00	<1.00	<1.00	<50.0			<2.00	<1.00	<1.00	<1.00	<10.0		
2/21/2004				no	<1.00	<1.00	<1.00	<1.00	<50.0			<2.00	<1.00	<1.00	<1.00	<10.0		
4/30/2004				no	<1.00	1.00	<1.00	<1.00	<50.0			<2.00	<1.00	<1.00	<1.00	<10.0		
7/10/2004				no	<1.00	<1.00	<1.00	<1.00	50.0			<2.00	<1.00	<1.00	<1.00	<10.0		
11/5/2004				no	<1.00	<1.00	<1.00	<1.00	<50.0			<2.00	<1.00	<1.00	<1.00	<10.0		

TABLE 2  
CUMULATIVE WATER LEVEL MEASUREMENTS AND GROUNDWATER ANALYSES  
MOBIL STATION 18MLJ  
5005 NORTH LONG BEACH BOULEVARD  
LONG BEACH, CALIFORNIA  
ERI 3163

Explanation:

ELEV = elevation

EPA = Environmental Protection Agency

GW = groundwater

DIPE = di-isopropyl ether

ETBE = ethyl tertiary butyl ether

TAME = tertiary amyl methyl ether

TBA = tertiary butyl alcohol

TPHd = total petroleum hydrocarbons as diesel

TPHg = total petroleum hydrocarbons as gasoline

TRPH = total recoverable petroleum hydrocarbons

MTBE = methyl tertiary butyl ether

MTBE analyzed by EPA Method 8260B.

LPH = liquid phase hydrocarbons (thickness measured in feet)

<10000 = not detected at or above stated laboratory reporting limit

ug/l = micrograms per liter

**APPENDIX A**

**SITE SAFETY PLAN**

**SITE SAFETY PLAN**  
**For**  
**Mobil Station 18MLJ**  
**5005 North Long Beach Boulevard**  
**Long Beach, California**  
**ERI No. 3163**

**INTRODUCTION**

This site safety plan describes basic safety requirements for associated site activities. The provisions set forth in this plan apply to the employees of Environmental Resolutions, Inc. (ERI) and its subcontractors working on this phase of the project. The subcontractors may elect to modify these provisions, but only to upgrade or increase the safety requirements, and only with the concurrence of ERI, as designated and accepted in writing.

This site safety plan will address the expected potential hazards that may be encountered on the work site for this project. If changes in site or working conditions occur as activities progress, addenda to this plan will be provided by ERI.

**AUTHORITY FOR SITE SAFETY**

The ERI personnel responsible for project safety are the Project Manager and the Staff Geologist or Engineer. The Health and Safety Coordinator is responsible for the overall ERI Health and Safety Program and may choose to audit the site for compliance and take appropriate action to correct deficiencies. The Project Manager is responsible for implementing the provisions of this plan, for providing a copy of this plan to the Staff Geologist or Engineer, and for advising the Staff Geologist or Engineer on health and safety matters. The Project Manager, Staff Geologist, and Engineer have the authority to audit site activities for compliance with the provisions of this plan. They may suspend or modify work practices or dismiss subcontractors whose conduct does not meet the requirements specified in this plan.

The staff Geologist or Engineer is responsible for communicating the information contained in this plan to the ERI personnel assigned to the project and to the responsible representative of each subcontractor working for ERI on the project. The Staff Geologist or Engineer will also act as the Site Safety Officer. As such, the Staff Geologist or Engineer is responsible for addressing the following items:

- o Implementing the Site Safety Plan, company policy, and procedures
- o Requiring and maintaining adequate safety supplies and equipment inventory on site
- o Conducting daily safety meetings and advising workers regarding hazards
- o Site control, decontamination, and contamination reduction procedures
- o Reporting accidents or incidents

The Staff Geologist or Engineer has the authority to suspend work any time he or she finds that the provisions of the plan are inadequate for worker safety. The Staff Geologist or Engineer will promptly inform the Project Manager and the Health and Safety Coordinator of deficiencies within the plan or individuals or subcontractors whose conduct is not consistent with the requirements of this plan.

### **MEDICAL SURVEILLANCE**

ERI personnel and subcontractors engaged in project activities must participate in a medical surveillance program and must be cleared by the examining physician(s) to wear respiratory protection devices and protective clothing for working with hazardous materials. The applicable requirements of Title 8, Section 5216 of the California Administrative Code will be observed. The applicable requirements under 29 CFR 1910.120 of the Federal Administrative Code will also be observed.

### **SAFETY AND ORIENTATION MEETING**

Field personnel from ERI and its subcontractors will attend a project-specific training meeting for safety issues and review the project tasks before beginning work. The meeting will be led by the Project Manager, Staff Geologist, or Engineer. In addition, fit-testing of respiratory protective devices will be conducted as part of the safety orientation meeting when the use of a respirator may be required.

### **HAZARD ASSESSMENT**

The major hazards expected to be encountered on the project are physical hazards associated with the movement of the extraction unit to the transportation vehicle.

The major contaminants expected to be encountered on the project are fuel-related hydrocarbon compounds. The anticipated contaminants and their exposure standards are listed in Table 1. It is not anticipated that the potential levels of exposure will reach the permissible exposure limits (PEL) or threshold limit values (TLV). Inhalation and dermal contact are the potential exposure pathways. Protective clothing will be mandatory for field personnel specified in this plan. In addition, respiratory protective devices are required to be worn by each



person on site or to be within easy reach should irritating odors be detected or irritation of the respiratory tract occur.

TABLE 1  
EXPOSURE LIMITS OF ANTICIPATED CHEMICAL CONTAMINANTS

Contaminant	PEL	EL	ED	CL	TWA	STEL
Benzene <sup>1</sup> [skin] & [carc]	1*	---	-----	---	0.5*	2.5*
Ethylbenzene	100*	---	-----	---	100*	125*
Gasoline <sup>2</sup>	300*	---	-----	---	300*	500*
MTBE	40*	---	-----	---	144*	---
Toluene [skin]	100*	200*	10 min per 8 hrs	500*	100*	150*
Xylene (o, m, & p isomers) [skin]	100*	200*	30 min per 8 hrs	300*	100*	150*

- PEL - permissible exposure limit: 8-hour, time-weighted average, California Occupational Safety and Health Administration Standard (CAL-OSHA)
- EL - excursion limit: maximum concentration of an airborne contaminant to which an employee may be exposed without regard to duration provided the 8-hour time-weighted average for PEL is not exceeded (CAL-OSHA)
- ED - excursion duration: maximum time period permitted for an exposure above the excursion limit but not exceeding the ceiling limit (CAL-OSHA)
- CL - ceiling limit: maximum permitted concentration of airborne contaminant which employees may be exposed (CAL-OSHA)
- TWA - time-weighted average: 8 hour, [same as threshold limit value (TLV)], American Conference of Governmental Industrial Hygienists (ACGIH)
- STEL - short-term exposure limit: 15 minute time-weighted average (ACGIH)

- \* - milligrams of substance per cubic meter of air ( $\text{mg}/\text{m}^3$ )
- \* - parts of gas or vapor per million parts air
- [carc] - substance identified as a suspected or confirmed carcinogen
- [skin] - substance may be absorbed into the bloodstream through the skin, mucous membranes, or eyes
- 1 - Federal OSHA benzene limits given for PEL and STEL; STEL has a 50-minute duration limit
- 2 - Federal OSHA gasoline limit given for PEL; STEL is the same for FED-OSHA and ACGIH

A brief description of the physical characteristics, incompatibilities, toxic effects, routes of entry, and target organs has been summarized from the NIOSH Pocket Guide to Chemical Hazards for the contaminants anticipated to be encountered. This information is used in on-site safety meetings to alert personnel to the hazards associated with the expected contaminants.

### **Benzene**

Benzene is a colorless, aromatic liquid. Benzene may create an explosion hazard. Benzene is incompatible with strong oxidizers, chlorine, and bromine with iron. Benzene is irritating to the eyes, nose, and respiratory system. Prolonged exposure may result in giddiness, headache, nausea, staggering gait, fatigue, bone marrow depression, or abdominal pain. Routes of entry include inhalation, absorption, ingestion, and skin or eye contact. The target organs are blood, the central nervous system (CNS), skin, bone marrow, eyes, and respiratory system. Benzene is carcinogenic.

### **Ethylbenzene**

Ethylbenzene is a colorless, aromatic liquid. Ethylbenzene may create an explosion hazard. Ethylbenzene is incompatible with strong oxidizers. Ethylbenzene is irritating to the eyes and mucous membranes. Prolonged exposure may result in headache, dermatitis, narcosis, or coma. Routes of entry include inhalation, ingestion, and skin or eye contact. The target organs are the eyes, upper respiratory system, skin, and the CNS.

### **Toluene**

Toluene is a colorless, aromatic liquid. Toluene may create an explosion hazard. Toluene is incompatible with strong oxidizers. Prolonged exposure may result in fatigue, confusion, euphoria, dermatitis, or photophobia. Routes of entry are inhalation, absorption, ingestion, and skin or eye contact. The target organs are the CNS, liver, kidneys, and skin.

### **Xylene Isomers**

Xylene is a colorless, aromatic liquid. Xylene may create an explosion hazard. Xylene is incompatible with strong oxidizers. Xylene is irritating to the eyes, nose, and throat. Prolonged exposure may result in dizziness, excitement, drowsiness, staggering gait, corneal vacuolization, vomiting, abdominal pain, or dermatitis. Routes

of entry are inhalation, absorption, ingestion, and skin or eye contact. The target organs are the CNS, eyes, gastrointestinal tract, blood, liver, kidneys, and skin.

### **Methyl Tertiary Butyl Ether (MTBE)**

MTBE is a clear colorless liquid. MTBE may create an explosion hazard. MTBE is incompatible with strong oxidizers and acids. Inhaling vapors can irritate the respiratory tract and cause central nervous system defects. Breathing high concentrations in air can cause lightheadedness, dizziness, weakness, nausea and headache. Routes of entry are ingestion, skin contact and eye contact.

## **GENERAL PROJECT SAFETY REQUIREMENTS**

Project activities will be conducted in accordance with the following minimum safety requirements:

- o Eating, drinking, and smoking will be restricted to designated area.
- o Gross decontamination and removal of all personal protective equipment will be performed before leaving the site. Contaminated clothing will be removed and collected in a drum for disposal.
- o Shaking or blowing dust or other materials off potentially contaminated clothing or equipment to remove dust or other materials is not permitted.
- o The Staff Geologist or Engineer will be responsible for taking steps to protect employees from physical hazards including:
  - \* Falling objects, such as tools or equipment
  - \* Falls from elevations
  - \* Tripping over hoses, pipes, tools, or equipment
  - \* Slipping on wet or oily surfaces
  - \* Insufficient or faulty protective equipment
  - \* Insufficient or faulty equipment or tools
- o All personnel will be required to wash hands and faces before eating, drinking, or smoking in the afore-mentioned designated areas.
- o Field personnel will be cautioned to inform each other of the non-visual effects of the presence of toxins, such as:
  - \* Headaches
  - \* Dizziness
  - \* Nausea
  - \* Blurred vision
  - \* Cramps
  - \* Irritation of eyes, skin, or respiratory tract
  - \* Changes in complexion or skin discoloration

- \* Changes in apparent motor coordination
- \* Changes in personality or demeanor
- \* Excessive salivation or changes in pupillary response
- \* Changes in speech ability or pattern
- o All field personnel will pay attention to biological hazards, such as used hypodermic needles, insects, snakes and wild vegetation.
  - \* Inspect work areas when arriving at site to identify hazard(s)
  - \* Use insect repellent as necessary
  - \* Use caution when opening enclosures and well vaults
  - \* Stay alert and safe distance away from biological hazards
  - \* Do not attempt to pick up discarded needles
  - \* Wear appropriate PPE including leather gloves, long sleeves and pants, and snake chaps if probability of encountering hazard(s)

### **PROTECTIVE EQUIPMENT REQUIREMENTS**

Field personnel and visitors are required to wear the following protective clothing and equipment, as a minimum, while in the work area at the job site:

- o Traffic safety vest
- o Safety glasses
- o Steel-toed boots

Field personnel engaged in work are required to wear the following equipment:

- o Hard hat (if overhead hazard exists)
- o Traffic safety vest
- o Safety glasses
- o Steel-toed boots
- o Standard Tyvek coveralls (when required by Staff Geologist or Engineer)
- o Respirator with organic vapor and acid gas cartridge (if lowest PEL or TLV is exceeded in the breathing zone or Staff Geologist or Engineer decides respirators should be worn)

### **RESPIRATORY PROTECTION PROGRAM**

This section summarizes the ERI Respiratory Protection Program. ERI subcontractors must have company medical surveillance and respiratory protection programs including adequate training of their employees. Subcontractors must provide personal protective equipment as required in this Site Safety Plan for their

employees. ERI will attempt to verify worker training but does not assume the responsibility of the employer in any way. The following sections outline the ERI Respiratory Protection Program.

Respirators are not issued to employees until the company physician conducts a complete physical and decides the employee can 1) wear personal protective equipment and 2) wear a respirator. After the physician has issued written approval to ERI, the Health and Safety Coordinator conducts the required training including these basic topics:

- o Applicable OSHA regulations 1910.134 and 1910.120
- o Nature of respiratory hazards to be encountered in the work environment and how to select proper respiratory equipment
- o Use of respirators and proper fitting
- o Functions and limitations of respirators
- o Cleaning, disinfection, inspection, maintenance, and storage of respirators

#### **Functions and Limitations of Respirators**

Respirators are not intended for and may not be used in atmospheres that are, or may become, immediately dangerous to life or health (IDLH) or in atmospheres where the identity or concentration of the contaminant(s) is unknown. Respirators may not be used in atmospheres containing less than 19.5 percent oxygen.

Cartridges or canisters for respirators are selected and supplied to employees by the Health and Safety Coordinator. The failure to choose or use a respirator equipped with cartridges or filters suitable for the contaminant(s) in the atmosphere or likely to be released in the atmosphere may result in the respirator providing little or no protection against the contaminated atmosphere. The Site Safety Plan specifies the contaminant(s) to be encountered and the type of cartridge or canister appropriate for personal protection.

Assuming that the respirator is properly fitted, in good condition, free from leaks, and has the proper cartridges for the contaminant(s) present, the length of time the respirator will provide protection also depends on the conditions of use.

The conditions of use include but are not limited to the following:

- o The concentration of contaminant(s) in the atmosphere
- o The temperature and humidity of the ambient atmosphere
- o Any previous use of the cartridges and filters
- o The elapsed time since the removal of the cartridges or filters from their protective packaging
- o The emotional state of the wearer
- o The level of physical activity of the wearer

Cartridges designed and specified to protect the wearer against airborne particles are not appropriate for protection against gases and vapors. Cartridges designed and specified for protection against specific gases and vapors are not appropriate for protection against airborne particles or other gases or vapors beyond the scope of that type of cartridge. If the label is missing or the type of cartridge is inappropriate, the cartridge may not be used under any circumstances; it will provide little or no protection to the wearer.

### **Danger Signals Indicating Possible Respirator Failure**

If any of the danger signals in the following list is experienced while wearing a respirator, immediately return to a fresh air environment. The cartridges or filters may be inappropriate or used up, or abnormal conditions may be creating vapor concentrations which are beyond the limits of the cartridges or filters. Danger is indicated when the individual subject to exposure:

- o Smells or tastes chemicals, or if eyes, nose, or throat become irritated;
- o Has difficulty breathing;
- o Notices that the breathing air becomes uncomfortably warm;
- o Experiences headaches, dizziness, cramps, nausea, or blurred vision;
- o Experiences changes in complexion or skin discoloration;
- o Experiences changes in motor coordination, personality, or demeanor;
- o Experiences changes in speech ability or pattern;
- o Experiences excessive salivation or changes in pupillary response.

### **Qualitative Respirator Fit Test**

Qualitative fit testing of each respirator must be conducted before the respirator may be used to check that a good fit is still obtained. The following steps should be taken in qualitative fit test of the respirator:

1. Don the face piece with cartridge or filters in place. Pull straps together and equally to avoid distorting the mask.
2. Adjust the face piece. Do not over-tighten it.
3. Negative Pressure Leak Check: Close off both inlet connections with palms of hands, inhale slowly, and hold breath momentarily. No leakage should be detected, and the face piece should be drawn slightly to the face.
4. Positive Pressure Leak Check: Close opening in the exhalation valve guard by placing palm of one hand over face of guard; exhale slowly maintaining slight positive pressure. No leakage should be detected between the face seal and the face.
5. Should any leakage be noted:
  - a) Adjust the head straps and face piece slightly; recheck for leakage.
  - b) Check condition of exhalation valve and seat. Check that both inlet gaskets are present and in proper condition.

- c) In the event the face piece cannot be adjusted so there is no leakage, DO NOT ENTER THE AREA REQUIRING PROTECTION. Due to your particular facial features, a different style or size face piece may be required to obtain a proper facial fit.

Note: Failure to perform a qualitative fit test of the respirator each time the respirator is donned may result in little or no respiratory protection.

### **Inspection, Cleaning, and Storage**

The respirator should be inspected, cleaned, and properly stored after use each day. The following steps are the basic elements of each procedure:

#### **A. Inspection**

1. Examine face seal for rips, tears, holes, deformation, or stiffness.
2. Examine face piece plastic center shell for cracks, missing components, or damaged threads.
3. Examine harness for breaks, cuts, frays, tears, and missing or damaged hardware.
4. Examine inhalation and exhalation valves and valve seats for cuts, cracks, or foreign matter which may not allow the valve to close completely. Check that valves are properly installed and are not distorted.
5. Examine cartridges for signs of abuse or damage. Discard damaged items.
6. Any respirator malfunction or deficiencies noted must be reported to the Health and Safety Coordinator who will issue a new respirator or correct the deficiencies using only approved spare parts from the manufacturer of the specific model in need of repair. Spare parts from any other manufacturer may not be used under any conditions. Instructions in the manual provided by the manufacturer should be followed when the respirator needs repairing or replacing.

#### **B. Cleaning**

1. Unthread cartridges or filters.
2. Wash the face piece with warm water and a mild detergent after each use.
3. Disinfect the face piece if it was used by another person. The mask should routinely (once per month) be disinfected even if the respirator is used solely by one individual. A hypochlorite solution may be used (i.e., 2 tablespoons chlorine bleach per gallon of water for an acceptable solution).
4. After cleaning and air-drying, check that the face piece is not damaged and that components removed prior to cleaning have been installed properly.

#### **C. Storage**

1. Place the respirator in its storage box in a heat-sealed or resealable plastic bag. Store flat to prevent the face seal from taking a permanent "set."
2. Replacement components should be stored in sealed packages in a cool, clean, low-humidity location until ready for use.

The Health and Safety Coordinator will explain ERI's Respiratory Protection Program to each new employee who must wear a respirator. The employee will be asked whether or not he or she understands the information provided. If the company physician has cleared the employee for respirator use and the Health and Safety Coordinator has checked the fit of the respirator, the employee will then be issued a respirator. A written record is signed and dated by the employee and Health and Safety Coordinator and kept in the new employee's Safety Record.

### **WORK ZONES AND SECURITY MEASURES**

Cones, wooden barricades or a suitable alternative will be used to deny public access to these work zones. The general public will not be allowed close to the work area under any conditions. If for any reason the safety of a member of the public (e.g., motorist or pedestrian) may be endangered, work will cease until the situation is remedied. Cones and warning signs will be used when necessary to redirect motorists or pedestrians.

### **EXPOSURE MONITORING PLAN**

It is not anticipated that project personnel exposure will exceed the TLVs or PELs of the materials; however, proper personal protective equipment will be worn while working at the site.

### **POSSIBLE EXPLOSIVE ATMOSPHERES**

Gasoline has a flammable range from approximately 1.4 to 7.6 percent in air. One percent in air is equivalent to 10,000 ppm; thus, the lower explosive limit (LEL) is 14,000 ppm. Normally explosive levels may be reached in tanks, pits, or other confined spaces. Any area suspected of containing potentially explosive levels of gasoline will be evaluated with an intrinsically safe or explosion-proof combustible gas indicator (CGI). Personnel response will be based on the following action levels from CGI readings:

- Less than 10 percent of LEL\* - then continue activities and monitoring
- 10 to 25 percent of LEL - then continue monitoring with extreme caution as higher levels are encountered
- Greater than 25 percent of LEL - then explosion hazard. Cease activities and vacate area immediately

\* CGI readings in percent of lower explosive limit

If an explosion potential is present on site beyond 25 percent of the LEL, then all ERI's personnel and subcontractors must immediately withdraw from the site. The hazard potential will be evaluated by ERI's management, and a plan of action will be assessed.



## **DECONTAMINATION PROCEDURES**

If warranted, work equipment and personal protective equipment will undergo gross decontamination on site. This gross decontamination will include washing contaminated equipment with a trisodium phosphate (TSP) solution.

## **EMERGENCY RESPONSE PROCEDURES**

In the event of a fire, explosion, or property damage, ERI will be immediately notified. If necessary, local fire or response agencies will be called.

In the event of an accident resulting in physical injury, first aid will be administered, and the injured worker will be transported to the nearest hospital or emergency medical clinic for emergency treatment. A physician's attention is required regardless of the severity of the injury.

### **Overt Personnel Exposure**

If overt personnel exposure occurs during the project, typical responses should include the following:

- |             |   |
|-------------|---|
| Skin or Eye | Wash and rinse affected area thoroughly with        |
| Contact:    | copious amounts of soap and water, then provide     |
|             | appropriate medical attention. Eyes and skin should |
|             | be rinsed for a minimum of 15 minutes upon          |
|             | chemical contamination.                             |
| Puncture    |   |
| Wound:      | Decontaminate and transport to emergency hospital.  |

**EMERGENCY TELEPHONE NUMBERS:**

Fire and Police ..... 911  
Hospital ..... (562) 933-2000

Long Beach Memorial Medical Center  
2801 Atlantic Avenue  
Long Beach, California 90806

**Directions:** Depart site on North Long Beach Boulevard heading south. Bear left (southeast) onto East Carson Street. Turn right onto Atlantic Avenue. Hospital is on the right-hand side of the street. Follow signs to the EMERGENCY entrance. (see attached map)

**Additional Contingency Telephone Numbers**

ENVIRONMENTAL RESOLUTIONS, INC., Lake Forest ..... (949) 457-8950  
Occupational Safety and Health Administration (OSHA) ..... (510) 568-8602  
Chemical Transportation Emergency Center (CHEMTREC) ..... (800) 424-9300

**Note:** CHEMTREC is a public service of the American Chemistry Council (formerly known as the Chemical Manufacturers Association). CHEMTREC can usually provide hazard information, warnings, and guidance when given the identification number or the name of the product and the nature of the problem. CHEMTREC can also get personnel in contact with the appropriate experts.

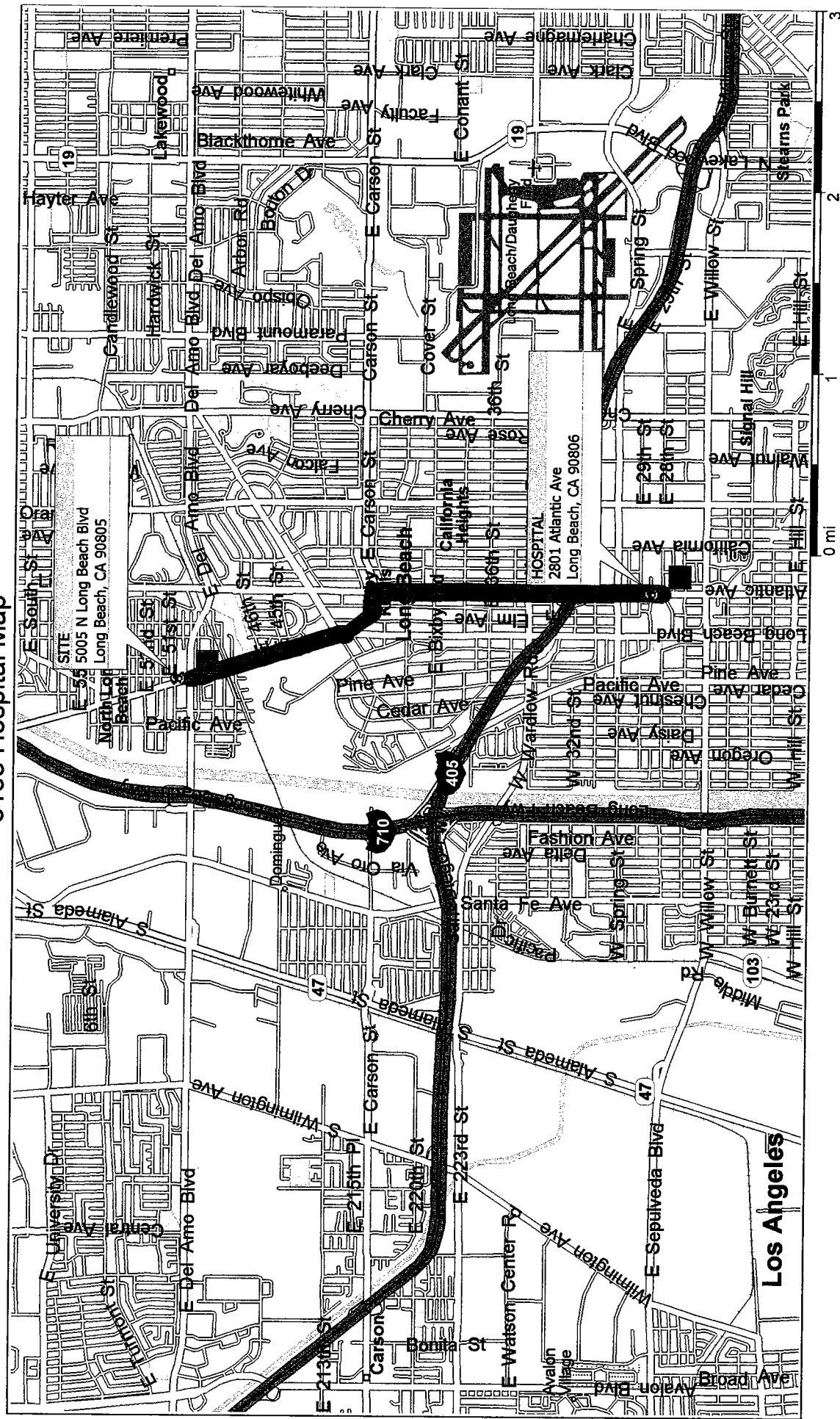
The following persons have reviewed this Site Safety Plan:

Project Manager: George Foley

Health and Safety Coordinator: Robert Moore

Amendments or modifications to this plan may be written on a separate page and attached to this plan. Any amendments or modifications must be reviewed and approved by the personnel named above.

# 3163 Hospital Map



## **ATTACHMENT A**

### **HEAT STRESS**

## HEAT STRESS PROTOCOL

If the ambient air temperature is above 80 degrees F, the need for heat stress and heat exhaustion monitoring will be evaluated. Heat stress and heat exhaustion monitoring will be required if the temperatures exceed 90 degrees F. Heat stroke is a life-threatening situation in which the victim's temperature control system, which produces sweating to cool the body, stops working. Body temperature can rise quickly to elevations causing brain damage and death. Heat exhaustion is less dangerous and results from the loss of body fluids. This fluid loss causes blood flow to decrease in vital organs resulting in a form of shock. High humidity (>70% relative humidity) may retard evaporation resulting in inadequate cooling of the body. Heat cramps are muscular spasms due to heavy exertion. These cramps usually involve the abdominal and leg muscles and are due to the loss of water and salt from heavy sweating.

	<u>Signs/Symptoms</u>	<u>First Aid</u>
<b>Heat Fatigue</b>	<ul style="list-style-type: none"><li>o Early warning sign of heat stress</li><li>o Too tired and weak to concentrate on doing job</li></ul>	<ul style="list-style-type: none"><li>o Move to cool place</li><li>o Drink water every 15 minutes</li></ul>
<b>Heat Cramps</b>	<ul style="list-style-type: none"><li>o Develops when a person sweats out more salt than the body takes in and the muscles cramp</li></ul>	<ul style="list-style-type: none"><li>o Move to cool place</li><li>o Drink water every 15 minutes</li><li>o Gatorade can help replace necessary salt</li></ul>
<b>Heat Exhaustion</b>	<ul style="list-style-type: none"><li>o Cool, pale, moist skin</li><li>o Heavy sweating</li><li>o Normal body temperature</li><li>o Dilated (large) pupils</li><li>o Headache and nausea</li><li>o Dizziness and vomiting</li></ul>	<ul style="list-style-type: none"><li>o Move to cool area</li><li>o Have victim lie down</li><li>o Slightly elevate feet</li><li>o Loosen clothing</li><li>o Apply wet towels</li><li>o Give a glass of water every 15 minutes</li></ul>
<b>Heat Stroke</b>	<ul style="list-style-type: none"><li>o Hot, red skin</li><li>o Constricted pupils</li><li>o High body temperature</li></ul>	<ul style="list-style-type: none"><li>o Call EMS (911)</li><li>o Check ABCs (airway, breathing, circulation)</li><li>o Immerse in cool water or</li></ul>

- |  |                         |
|--|-------------------------|
| o Little or no perspiration                | o Wrap in wet towels    |
| o Chills, confusion and strong rapid pulse | o Give nothing by mouth |

Be sure there is adequate shade at or near the site for employees to rest. Have two gallons of water (or electrolyte solution/Gatorade) per employee at the site. Encourage employees to drink plenty of fluids and implement the following break schedule:

- o Work for 1 to 1.5 hours.
- o Break for 15 minutes.
- o Count the radial pulse of all personnel for 30 seconds (and multiply by 2 to get beats per minute) at the beginning of the break period.
- o If the heart rate exceeds 110 beats per minute (BPM), shorten the next work cycle by 1/3 and keep the rest periods at 15 minutes.
- o If the heart rate exceeds 110 BPM at the next rest period, shorten the next work cycle by 1/3 again, keeping the 15 minute breaks.
- o If the heart rate ever exceeds 120 BPM, the employee will be required to rest for 30-45 minutes to allow the heart rate to decrease.

The site safety officer (project manager, staff engineer/geologist or senior technician) will institute these procedures and monitor employees for signs of heat stress. Preventing heat stress is particularly important because once someone suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat injuries.

## **ATTACHMENT B**

### **MATERIAL SAFETY DATA SHEETS**

EXXON COMPANY, U.S.A.  
A DIVISION OF EXXON CORPORATION

EXXON REGULAR (UNLEADED)

DATE ISSUED: 09/15/93  
SUPERSEDES DATE: 09/11/92

## MATERIAL SAFETY DATA SHEET

EXXON COMPANY, U.S.A. P.O. BOX 2180 HOUSTON, TX 77252-2180

### A. IDENTIFICATION AND EMERGENCY INFORMATION

PRODUCT NAME  
EXXON REGULAR (UNLEADED)

PRODUCT CODE  
026000 - 00308

PRODUCT CATEGORY  
Motor Gasoline

PRODUCT APPEARANCE AND ODOR  
Clear colored liquid (typically yellow)  
Gasoline hydrocarbon odor

MEDICAL EMERGENCY TELEPHONE NUMBER  
(713) 656-3424

### B. COMPONENTS AND HAZARD INFORMATION

#### COMPONENTS

CAS NO. OF  
COMPONENTS APPROXIMATE  
CONCENTRATION

Product is a variable complex mixture of components, principally hydrocarbons, blended to performance, rather than chemical specifications and typically contains the following:

Naphtha (petroleum), light catalytic cracked	64741-55-5	
Naphtha (petroleum), heavy catalytic cracked	64741-54-4	
Naphtha (petroleum), full-range reformed	68919-37-9	
Naphtha (petroleum), full-range alkylate	64741-64-6	
Naphtha (petroleum), sweetened	64741-87-3	
Butane	106-97-8	
Proprietary additives	Proprietary	
It may include varying amounts of the following identifiable components:		
Benzene	71-43-2	0-4.9%
Cumene	98-82-8	0-1%
Cyclohexane	110-82-7	0-1%
Ethylbenzene	100-41-4	0-3%
Naphthalene	91-20-3	0-1%
Normal hexane	110-54-3	0-3%
Toluene	108-88-3	0-20%
Xylene	1330-20-7	0-10%
It may also include varying amounts of oxygenates such as the following:		
Ethanol	64-17-5	0-10%



Ethyl-tertiary-butyl ether 637-92-3 0-18.5%  
Methyl-tertiary-butyl ether 1634-04-4 0-16%  
Tertiary-amyl-methyl-ether 994-05-8 0-18.5%  
All components of this product are listed on the U.S. TSCA inventory.  
See Section E for Health and Hazard Information.  
See Section H for additional Environmental information.

#### HAZARDOUS MATERIALS IDENTIFICATION SYSTEM (HMIS)

Health Flammability Reactivity  
1 3 0  
EXPOSURE LIMIT FOR TOTAL PRODUCT  
100 ppm (300 mg/m<sup>3</sup>) for an 8-hour  
workday

50 ppm (187 mg/m<sup>3</sup>) for toluene  
(skin) for an 8-hour workday

50 ppm (180 mg/m<sup>3</sup>) for methyl-  
tertiary-butyl ether for a 15  
minute STEL

The airborne benzene level shall  
not exceed 1 ppm for an 8-hour  
workday; 5 ppm STEL

#### BASIS

Recommended by Exxon

#### BASIS

Recommended by Exxon. OSHA Regulation  
29 CFR 1910.1000 and the American  
Conference of Governmental Industrial  
Hygienists (ACGIH) list Threshold Limit  
Values (TLV) of 300 ppm (900 mg/m<sup>3</sup>) for  
gasoline for an 8-hour workday; 500 ppm  
(1500 mg/m<sup>3</sup>) STEL.

Recommended by the American Conference  
of Governmental Industrial Hygienists  
(ACGIH)

Recommended by Exxon

OSHA Regulation 29 CFR 1910.1028

### C. PRIMARY ROUTES OF ENTRY AND EMERGENCY AND FIRST AID PROCEDURES

#### EYE CONTACT

If splashed into the eyes, flush with clear water for 15 minutes or until  
irritation subsides. If irritation persists, call a physician.

#### SKIN

In case of skin contact, remove any contaminated clothing and wash skin with  
soap and water. Launder or dry-clean clothing before reuse. If product is  
injected into or under the skin, or into any part of the body, regardless of  
the appearance of the wound or its size, the individual should be evaluated  
immediately by a physician as a surgical emergency. Even though initial  
symptoms from high pressure injection may be minimal or absent, early surgical  
treatment within the first few hours may significantly reduce the ultimate  
extent of injury.

#### INHALATION

If overcome by vapor, remove from exposure and call a physician immediately.  
If breathing is irregular or has stopped, start resuscitation, administer  
oxygen, if available.

#### INGESTION

If ingested, DO NOT induce vomiting; call a physician immediately.

### D. FIRE AND EXPLOSION HAZARD INFORMATION

## UNUSUAL FIRE AND EXPLOSION HAZARD

EXTREMELY FLAMMABLE VAPORS CAN TRAVEL AND EXPLODE

### FLASH POINT (MINIMUM)

FLAMMABLE - Per DOT 49 CFR 173.120

Approximately -38°C (-36°F)

### AUTOIGNITION TEMPERATURE

Approximately 456°C (853°F)

National Fire Protection  
Association's Guide on  
Hazardous Materials

### NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) - HAZARD IDENTIFICATION

Health Flammability Reactivity

1

3

0

#### BASIS

Recommended by the National Fire  
Protection Association

### HANDLING PRECAUTIONS

This liquid is volatile and gives off invisible vapors. Either the liquid or vapor may settle in low areas or travel some distance along the ground or surface to ignition sources where they may ignite or explode.

Keep product away from ignition sources, such as heat, sparks, pilot lights, static electricity, and open flames.

### FLAMMABLE OR EXPLOSIVE LIMITS (APPROXIMATE PERCENT BY VOLUME IN AIR)

Estimated values: Lower Flammable Limit 1.4% Upper Flammable Limit 7.6%

### EXTINGUISHING MEDIA AND FIRE FIGHTING PROCEDURES

Foam, water spray (fog), dry chemical, carbon dioxide and vaporizing liquid type extinguishing agents may all be suitable for extinguishing fires involving this type of product, depending on size or potential size of fire and circumstances related to the situation. Plan fire protection and response strategy through consultation with local fire protection authorities or appropriate specialists.

The following procedures for this type of product are based on the recommendations in the National Fire Protection Association's "Fire Protection Guide on Hazardous Materials", Tenth Edition (1991):

Use dry chemical, foam or carbon dioxide to extinguish the fire. Water may be ineffective, but water should be used to keep fire-exposed containers cool.

If a leak or spill has ignited, use water spray to disperse the vapors and to protect men attempting to stop a leak. Water spray may be used to flush spills away from exposures. Minimize breathing of gases, vapor, fumes or decomposition products. Use supplied-air breathing equipment for enclosed or confined spaces or as otherwise needed.

NOTE: The inclusion of the phrase "water may be ineffective" is to indicate that although water can be used to cool and protect exposed material, water may not extinguish the fire unless used under favorable conditions by experienced fire fighters trained in fighting all types of flammable liquid fires.

### DECOMPOSITION PRODUCTS UNDER FIRE CONDITIONS

Fumes, smoke, carbon monoxide, sulfur oxides, aldehydes and other decomposition products, in the case of incomplete combustion.

### "EMPTY" CONTAINER WARNING

"Empty" containers retain residue (liquid and/or vapor) and can be dangerous. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. Do not attempt to clean

since residue is difficult to remove. "Empty" drums should be completely drained, properly bunged and promptly returned to a drum reconditioner. All other containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. For work on tanks refer to Occupational Safety and Health Administration regulations, ANSI Z49.1, and other governmental and industrial references pertaining to cleaning, repairing, welding, or other contemplated operations.

## E. HEALTH AND HAZARD INFORMATION

### VARIABILITY AMONG INDIVIDUALS

Health studies have shown that many petroleum hydrocarbons and synthetic lubricants pose potential human health risks which may vary from person to person. As a precaution, exposure to liquids, vapors, mists or fumes should be minimized.

### EFFECTS OF OVEREXPOSURE (Signs and symptoms of exposure)

High vapor concentrations (greater than approximately 1000 ppm) are irritating to the eyes and the respiratory tract, and may cause headaches, dizziness, anesthesia, drowsiness, unconsciousness, and other central nervous system effects, including death.

Prolonged or repeated liquid contact with the skin will dry and defat the skin, leading to possible irritation and dermatitis.

### NATURE OF HAZARD AND TOXICITY INFORMATION

**WARNING:** Concentrated, prolonged or deliberate inhalation of this product may cause brain and nervous system damage. Prolonged and repeated exposure of pregnant animals to high levels of toluene (levels greater than approximately 1500 ppm) has been reported to cause adverse fetal developmental effects.

Prolonged or repeated skin contact with this product tends to remove skin oils, possibly leading to irritation and dermatitis; however, based on human experience and available toxicological data, this product is judged to be neither a "corrosive" nor an "irritant" by OSHA criteria.

Product contacting the eyes may cause eye irritation.

This product may contain up to a maximum of 4.9 weight percent benzene, CAS # 71-43-2, as a natural constituent of various gasoline blend components. Benzene can cause anemia and other blood diseases, including leukemia (cancer of the blood-forming system), after prolonged or repeated exposures at high concentrations (e.g., 50-500 ppm). It has also caused fetal defects in tests on laboratory animals.

Contains light hydrocarbon components. Lifetime studies by the American Petroleum Institute have shown that kidney damage and kidney cancer can occur in male rats after prolonged inhalation exposures at elevated concentrations of total gasoline. Kidneys of mice and female rats were unaffected. The U.S. EPA Risk Assessment Forum has concluded that the male rat kidney tumor results are not relevant for humans. Total gasoline exposure also produced liver tumors in female mice only. The implication of these data for humans has not been determined. Certain components, such as normal hexane, may also affect the nervous system at high concentrations (e.g., 1000-1500 ppm).

Product has a low order of acute oral and dermal toxicity, but minute amounts aspirated into the lungs during ingestion or vomiting may cause mild to severe pulmonary injury and possibly death.

This product is judged to have an acute oral LD50 (rat) greater than 5 g/kg of body weight, and an acute dermal LD50 (rabbit) greater than 3.16 g/kg of body weight.

Inhalation of components of exhaust from burning, such as carbon monoxide, may cause death at high concentrations. Exposure to the exhaust of this fuel

should be minimized.  
PRE-EXISTING MEDICAL CONDITIONS WHICH MAY BE AGGRAVATED BY EXPOSURE  
Benzene - Individuals with liver disease may be more susceptible to toxic effects.  
Hexane - Individuals with neurological disease should avoid exposure.  
Petroleum Solvents/Petroleum Hydrocarbons - Skin contact may aggravate an existing dermatitis.

## F. PHYSICAL DATA

The following data are approximate or typical values and should not be used for precise design purposes.

### BOILING RANGE

Approximately 21°C (70°F) IBP  
to 227°C (440°F) FBP

### VAPOR PRESSURE

Varies seasonally from  
approximately 5 to 15 psi  
Reid Vapor Pressure

### SPECIFIC GRAVITY (15.6°C/15.6°C)

Approximately 0.74

### VAPOR DENSITY (AIR = 1)

Approximately 5

### MOLECULAR WEIGHT

Complex mixture, components vary  
from approximately 45 to 185

### PERCENT VOLATILE BY VOLUME

100

### pH

Essentially neutral

### EVAPORATION RATE @ 1 ATM. AND 25°C

(77°F) (n-BUTYL ACETATE = 1)  
Approximately 10-11

### POUR, CONGEALING OR MELTING POINT

Less than -38°C (-36°F)  
Pour Point by ASTM D 97

### SOLUBILITY IN WATER @ 1 ATM.

AND 25°C (77°F)  
Negligible; less than 0.1%

### VISCOSITY

Approximately 0.5 cSt @ 25°C

## G. REACTIVITY

This product is stable and will not react violently with water. Hazardous polymerization will not occur. Avoid contact with strong oxidants such as liquid chlorine, concentrated oxygen, sodium hypochlorite, calcium hypochlorite, etc., as this presents a serious explosion hazard.

## H. ENVIRONMENTAL INFORMATION

### STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Shut off and eliminate all ignition sources. Keep people away. Recover free product. Add sand, earth or other suitable absorbent to spill area. Minimize breathing vapors. Minimize skin contact. Ventilate confined spaces. Open all windows and doors. Keep product out of sewers and watercourses by diking or impounding. Advise authorities if product has entered or may enter sewers, watercourses, or extensive land areas.

Assure conformity with applicable governmental regulations. Continue to observe precautions for volatile, flammable vapors from absorbed material.

THE FOLLOWING INFORMATION MAY BE USEFUL IN COMPLYING WITH VARIOUS STATE AND FEDERAL LAWS AND REGULATIONS UNDER VARIOUS ENVIRONMENTAL STATUTES:

REPORTABLE QUANTITY (RQ), EPA REGULATION 40 CFR 302 (CERCLA Section 102)

The RQ for:

Benzene is 10 lbs. This product may contain up to 4.9% benzene.

Cumene is 5,000 lbs. This product may contain up to 1% cumene.

Cyclohexane is 1,000 lbs. This product may contain up to 1% cyclohexane.

Ethylbenzene is 1,000 lbs. This product may contain up to 3% ethylbenzene.

Methyl-tertiary-butyl ether is 1 lb. This product may contain up to 16% methyl-tertiary-butyl ether.

Naphthalene is 100 lbs. This product may contain up to 1% naphthalene.

Toluene is 1,000 lbs. This product may contain up to 20% toluene.

Xylene is 1,000 lbs. This product may contain up to 10% xylene.

THRESHOLD PLANNING QUANTITY (TPQ), EPA REGULATION 40 CFR 355 (SARA Sections 301-304)

No TPQ for product or any constituent greater than 1% or 0.1% (carcinogen).

TOXIC CHEMICAL RELEASE REPORTING, EPA REGULATION 40 CFR 372 (SARA Section 313)

This product may contain:

Up to 4.9% benzene.

Up to 1% cumene.

Up to 1% cyclohexane.

Up to 3% ethylbenzene.

Up to 16% methyl-tertiary-butyl ether.

Up to 1% naphthalene.

Up to 20% toluene.

Up to 10% xylene.

HAZARDOUS CHEMICAL REPORTING, EPA REGULATION 40 CFR 370 (SARA Sections 311-312)

EPA HAZARD	Acute	Chronic	Fire	Pressure	Reactive	Not
CLASSIFICATION CODE:	Hazard	Hazard	Hazard	Hazard	Hazard	Applicable
	XXX	XXX	XXX			

## I. PROTECTION AND PRECAUTIONS

### VENTILATION

Use only with ventilation sufficient to prevent exceeding recommended exposure limit or buildup of explosive concentrations of vapor in air. No smoking, or use of flame or other ignition sources.

### RESPIRATORY PROTECTION

Use supplied-air respiratory protection in confined or enclosed spaces, if needed.

### PROTECTIVE GLOVES

Use chemical-resistant gloves, if needed, to avoid prolonged or repeated skin contact.

### EYE PROTECTION

Use splash goggles or face shield when eye contact may occur.

### OTHER PROTECTIVE EQUIPMENT

Use chemical-resistant apron or other impervious clothing, if needed, to avoid contaminating regular clothing, which could result in prolonged or repeated

skin contact.

#### WORK PRACTICES / ENGINEERING CONTROLS

Keep containers closed when not in use. Do not store near heat, sparks, flame or strong oxidants. Adequate ventilation required sufficient to prevent exceeding recommended exposure limit or buildup of explosive concentrations of vapor in air. Tanks that have been in leaded gasoline service may have lead-containing residue. Special precautions needed in cleaning. See American Petroleum Institute publications 2013, 2015 and 2015A. No smoking, flame or other ignition sources.

To minimize fire or explosion risk from static charge accumulation and discharge, effectively ground product transfer system in accordance with the National Fire Protection Association standard for petroleum products.

For use as a motor fuel only. Do not use as a cleaning solvent, or thinner, or for other non-motor fuel uses. Do not siphon by mouth. Minute amounts of liquid gasoline aspirated into the lungs may cause potentially fatal chemical pneumonitis.

In order to prevent fire or explosion hazards, use appropriate equipment. Information on electrical equipment appropriate for use with this product may be found in the latest edition of the National Electrical Code (NFPA-70). This document is available from the National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269.

#### PERSONAL HYGIENE

Minimize breathing vapor or mist. Avoid prolonged or repeated contact with skin. Remove contaminated clothing; launder or dry-clean before re-use. Remove contaminated shoes and thoroughly clean and dry before re-use. Cleanse skin thoroughly after contact, before breaks and meals, and at end of work period. Product is readily removed from skin by waterless hand cleaners followed by washing thoroughly with soap and water.

## J. TRANSPORTATION AND OSHA RELATED LABEL INFORMATION

#### TRANSPORTATION INCIDENT INFORMATION

For further information relative to spills resulting from transportation incidents, refer to latest Department of Transportation Emergency Response Guidebook for Hazardous Materials Incidents.

#### U.S. DOT HAZARDOUS MATERIALS SHIPPING DESCRIPTION

Gasoline, 3, UN 1203, II

#### OSHA REQUIRED LABEL INFORMATION

In compliance with hazard and right-to-know requirements, where applicable OSHA Hazard Warnings may be found on the label, bill of lading or invoice accompanying this shipment.

**DANGER!**

**EXTREMELY FLAMMABLE**  
**LONG-TERM, REPEATED EXPOSURE MAY CAUSE**  
**CANCER, BLOOD AND NERVOUS SYSTEM DAMAGE**  
**CONTAINS: BENZENE**

Note: Product label may contain non-OSHA related information also.

The information and recommendations contained herein are, to the best of Exxon's knowledge and belief, accurate and reliable as of the date issued. Exxon does not warrant or guarantee their accuracy or reliability, and Exxon shall not be liable for any loss or damage arising out of the use thereof.

The information and recommendations are offered for the user's consideration and examination, and it is the user's responsibility to satisfy itself that they are suitable and complete for its particular use. If buyer repackages this product, legal counsel should be consulted to insure proper health, safety and other necessary information is included on the container.

The Environmental Information included under Section H hereof as well as the Hazardous Materials Identification System (HMIS) and National Fire Protection Association (NFPA) ratings have been included by Exxon Company, U.S.A. in order to provide additional health and hazard classification information. The ratings recommended are based upon the criteria supplied by the developers of these rating systems, together with Exxon's interpretation of the available data.

FOR LUBRICANTS TECHNICAL ASSISTANCE CALL: 1-800-443-9966

FOR FUELS TECHNICAL ASSISTANCE CALL: 713-656-5827

FOR AN MSDS OR ASSISTANCE WITH AN MSDS, DIRECT INQUIRIES TO THE ADDRESS BELOW OR CALL:

MARKETING TECHNICAL SERVICES  
EXXON COMPANY, U.S.A.  
ROOM 2355  
P. O. BOX 2180  
HOUSTON, TX 77252-2180  
(713) 656-5949

EXXON COMPANY, U.S.A.  
A DIVISION OF EXXON CORPORATION

EXXON SUPREME GASOLINE

DATE ISSUED: 09/15/93  
SUPERSEDES DATE: 09/11/92

## MATERIAL SAFETY DATA SHEET

EXXON COMPANY, U.S.A. P.O. BOX 2180 HOUSTON, TX 77252-2180

### A. IDENTIFICATION AND EMERGENCY INFORMATION

PRODUCT NAME  
EXXON SUPREME GASOLINE

PRODUCT CODE  
014000 - 00270

PRODUCT CATEGORY  
Motor Gasoline

PRODUCT APPEARANCE AND ODOR  
Clear colored liquid (typically red)  
Gasoline hydrocarbon odor

MEDICAL EMERGENCY TELEPHONE NUMBER  
(713) 656-3424

### B. COMPONENTS AND HAZARD INFORMATION

COMPONENTS	CAS NO. OF COMPONENTS	APPROXIMATE CONCENTRATION
------------	--------------------------	------------------------------

Product is a variable complex mixture of components, principally hydrocarbons, blended to performance, rather than chemical specifications and typically contains the following:

Naphtha (petroleum), light catalytic cracked	64741-55-5	
--	------------	--

Naphtha (petroleum), heavy catalytic cracked	64741-54-4	
--	------------	--

Naphtha (petroleum), full-range reformed	68919-37-9	
--	------------	--

Naphtha (petroleum), full-range alkylate	64741-64-6	
--	------------	--

Naphtha (petroleum), sweetened	64741-87-3	
--------------------------------	------------	--

Butane	106-97-8	
--------	----------	--

Proprietary additives	Proprietary	
-----------------------	-------------	--

It may include varying amounts of the following identifiable components:

Benzene	71-43-2	0-4.9%
---------	---------	--------

Cumene	98-82-8	0-1%
--------	---------	------

Cyclohexane	110-82-7	0-1%
-------------	----------	------

Ethylbenzene	100-41-4	0-3%
--------------	----------	------

Naphthalene	91-20-3	0-1%
-------------	---------	------

Normal hexane	110-54-3	0-3%
---------------	----------	------

Toluene	108-88-3	0-20%
---------	----------	-------

Xylene	1330-20-7	0-10%
--------	-----------	-------

It may also include varying amounts of oxygenates such as the following:

Ethanol	64-17-5	0-10%
---------	---------	-------



Ethyl-tertiary-butyl ether	637-92-3	0-18.5%
Methyl-tertiary-butyl ether	1634-04-4	0-16%
Tertiary-amyl-methyl-ether	994-05-8	0-18.5%

All components of this product are listed on the U.S. TSCA inventory.  
See Section E for Health and Hazard Information.  
See Section H for additional Environmental information.

#### HAZARDOUS MATERIALS IDENTIFICATION SYSTEM (HMIS)

Health	Flammability	Reactivity	BASIS
1	3	0	Recommended by Exxon
EXPOSURE LIMIT FOR TOTAL PRODUCT			BASIS
100 ppm (300 mg/m <sup>3</sup> ) for an 8-hour workday			Recommended by Exxon. OSHA Regulation 29 CFR 1910.1000 and the American Conference of Governmental Industrial Hygienists (ACGIH) list Threshold Limit Values (TLV) of 300 ppm (900 mg/m <sup>3</sup> ) for gasoline for an 8-hour workday; 500 ppm (1500 mg/m <sup>3</sup> ) STEL.
50 ppm (187 mg/m <sup>3</sup> ) for toluene (skin) for an 8-hour workday			Recommended by the American Conference of Governmental Industrial Hygienists (ACGIH)
50 ppm (180 mg/m <sup>3</sup> ) for methyl-tertiary-butyl ether for a 15 minute STEL			Recommended by Exxon
The airborne benzene level shall not exceed 1 ppm for an 8-hour workday; 5 ppm STEL			OSHA Regulation 29 CFR 1910.1028

### C. PRIMARY ROUTES OF ENTRY AND EMERGENCY AND FIRST AID PROCEDURES

#### EYE CONTACT

If splashed into the eyes, flush with clear water for 15 minutes or until irritation subsides. If irritation persists, call a physician.

#### SKIN

In case of skin contact, remove any contaminated clothing and wash skin with soap and water. Launder or dry-clean clothing before reuse. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

#### INHALATION

If overcome by vapor, remove from exposure and call a physician immediately. If breathing is irregular or has stopped, start resuscitation, administer oxygen, if available.

#### INGESTION

If ingested, DO NOT induce vomiting; call a physician immediately.

### D. FIRE AND EXPLOSION HAZARD INFORMATION

## UNUSUAL FIRE AND EXPLOSION HAZARD

EXTREMELY FLAMMABLE VAPORS CAN TRAVEL AND EXPLODE

### FLASH POINT (MINIMUM)

FLAMMABLE - Per DOT 49 CFR 173.120  
Approximately -38°C (-36°F)

### AUTOIGNITION TEMPERATURE

Approximately 456°C (853°F)  
National Fire Protection  
Association's Guide on  
Hazardous Materials

### NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) - HAZARD IDENTIFICATION

Health Flammability Reactivity

1

3

0

#### BASIS

Recommended by the National Fire  
Protection Association

### HANDLING PRECAUTIONS

This liquid is volatile and gives off invisible vapors. Either the liquid or vapor may settle in low areas or travel some distance along the ground or surface to ignition sources where they may ignite or explode. Keep product away from ignition sources, such as heat, sparks, pilot lights, static electricity, and open flames.

### FLAMMABLE OR EXPLOSIVE LIMITS (APPROXIMATE PERCENT BY VOLUME IN AIR)

Estimated values: Lower Flammable Limit 1.4% Upper Flammable Limit 7.6%

### EXTINGUISHING MEDIA AND FIRE FIGHTING PROCEDURES

Foam, water spray (fog), dry chemical, carbon dioxide and vaporizing liquid type extinguishing agents may all be suitable for extinguishing fires involving this type of product, depending on size or potential size of fire and circumstances related to the situation. Plan fire protection and response strategy through consultation with local fire protection authorities or appropriate specialists.

The following procedures for this type of product are based on the recommendations in the National Fire Protection Association's "Fire Protection Guide on Hazardous Materials", Tenth Edition (1991):

Use dry chemical, foam or carbon dioxide to extinguish the fire. Water may be ineffective, but water should be used to keep fire-exposed containers cool.

If a leak or spill has ignited, use water spray to disperse the vapors and to protect men attempting to stop a leak. Water spray may be used to flush spills away from exposures. Minimize breathing of gases, vapor, fumes or decomposition products. Use supplied-air breathing equipment for enclosed or confined spaces or as otherwise needed.

NOTE: The inclusion of the phrase "water may be ineffective" is to indicate that although water can be used to cool and protect exposed material, water may not extinguish the fire unless used under favorable conditions by experienced fire fighters trained in fighting all types of flammable liquid fires.

### DECOMPOSITION PRODUCTS UNDER FIRE CONDITIONS

Fumes, smoke, carbon monoxide, sulfur oxides, aldehydes and other decomposition products, in the case of incomplete combustion.

### "EMPTY" CONTAINER WARNING

"Empty" containers retain residue (liquid and/or vapor) and can be dangerous. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. Do not attempt to clean

since residue is difficult to remove. "Empty" drums should be completely drained, properly bunged and promptly returned to a drum reconditioner. All other containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. For work on tanks refer to Occupational Safety and Health Administration regulations, ANSI Z49.1, and other governmental and industrial references pertaining to cleaning, repairing, welding, or other contemplated operations.

## E. HEALTH AND HAZARD INFORMATION

### VARIABILITY AMONG INDIVIDUALS

Health studies have shown that many petroleum hydrocarbons and synthetic lubricants pose potential human health risks which may vary from person to person. As a precaution, exposure to liquids, vapors, mists or fumes should be minimized.

### EFFECTS OF OVEREXPOSURE (Signs and symptoms of exposure)

High vapor concentrations (greater than approximately 1000 ppm) are irritating to the eyes and the respiratory tract, and may cause headaches, dizziness, anesthesia, drowsiness, unconsciousness, and other central nervous system effects, including death.

Prolonged or repeated liquid contact with the skin will dry and defat the skin, leading to possible irritation and dermatitis.

### NATURE OF HAZARD AND TOXICITY INFORMATION

**WARNING:** Concentrated, prolonged or deliberate inhalation of this product may cause brain and nervous system damage. Prolonged and repeated exposure of pregnant animals to high levels of toluene (levels greater than approximately 1500 ppm) has been reported to cause adverse fetal developmental effects.

Prolonged or repeated skin contact with this product tends to remove skin oils, possibly leading to irritation and dermatitis; however, based on human experience and available toxicological data, this product is judged to be neither a "corrosive" nor an "irritant" by OSHA criteria.

Product contacting the eyes may cause eye irritation.

This product may contain up to a maximum of 4.9 weight percent benzene, CAS # 71-43-2, as a natural constituent of various gasoline blend components. Benzene can cause anemia and other blood diseases, including leukemia (cancer of the blood-forming system), after prolonged or repeated exposures at high concentrations (e.g., 50-500 ppm). It has also caused fetal defects in tests on laboratory animals.

Contains light hydrocarbon components. Lifetime studies by the American Petroleum Institute have shown that kidney damage and kidney cancer can occur in male rats after prolonged inhalation exposures at elevated concentrations of total gasoline. Kidneys of mice and female rats were unaffected. The U.S. EPA Risk Assessment Forum has concluded that the male rat kidney tumor results are not relevant for humans. Total gasoline exposure also produced liver tumors in female mice only. The implication of these data for humans has not been determined. Certain components, such as normal hexane, may also affect the nervous system at high concentrations (e.g., 1000-1500 ppm).

Product has a low order of acute oral and dermal toxicity, but minute amounts aspirated into the lungs during ingestion or vomiting may cause mild to severe pulmonary injury and possibly death.

This product is judged to have an acute oral LD50 (rat) greater than 5 g/kg of body weight, and an acute dermal LD50 (rabbit) greater than 3.16 g/kg of body weight.

Inhalation of components of exhaust from burning, such as carbon monoxide, may cause death at high concentrations. Exposure to the exhaust of this fuel

should be minimized.

**PRE-EXISTING MEDICAL CONDITIONS WHICH MAY BE AGGRAVATED BY EXPOSURE**

Benzene - Individuals with liver disease may be more susceptible to toxic effects.

Hexane - Individuals with neurological disease should avoid exposure.

Petroleum Solvents/Petroleum Hydrocarbons - Skin contact may aggravate an existing dermatitis.

## F. PHYSICAL DATA

The following data are approximate or typical values and should not be used for precise design purposes.

**BOILING RANGE**

Approximately 21°C (70°F) IBP  
to 227°C (440°F) FBP

**VAPOR PRESSURE**

Varies seasonally from  
approximately 5 to 15 psi  
Reid Vapor Pressure

**SPECIFIC GRAVITY (15.6°C/15.6°C)**

Approximately 0.74

**VAPOR DENSITY (AIR = 1)**

Approximately 5

**MOLECULAR WEIGHT**

Complex mixture, components vary  
from approximately 45 to 185

**PERCENT VOLATILE BY VOLUME**

100

**pH**

Essentially neutral

**EVAPORATION RATE @ 1 ATM. AND 25°C**

(77°F) (n-BUTYL ACETATE = 1)  
Approximately 10-11

**POUR, CONGEALING OR MELTING POINT**

Less than -38°C (-36°F)  
Pour Point by ASTM D 97

**SOLUBILITY IN WATER @ 1 ATM.**

AND 25°C (77°F)  
Negligible; less than 0.1%

**VISCOSITY**

Approximately 0.5 cSt @ 25°C

## G. REACTIVITY

This product is stable and will not react violently with water. Hazardous polymerization will not occur. Avoid contact with strong oxidants such as liquid chlorine, concentrated oxygen, sodium hypochlorite, calcium hypochlorite, etc., as this presents a serious explosion hazard.

## H. ENVIRONMENTAL INFORMATION

**STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED**

Shut off and eliminate all ignition sources. Keep people away. Recover free product. Add sand, earth or other suitable absorbent to spill area. Minimize breathing vapors. Minimize skin contact. Ventilate confined spaces. Open all windows and doors. Keep product out of sewers and watercourses by diking or impounding. Advise authorities if product has entered or may enter sewers, watercourses, or extensive land areas.

Assure conformity with applicable governmental regulations. Continue to observe precautions for volatile, flammable vapors from absorbed material.

THE FOLLOWING INFORMATION MAY BE USEFUL IN COMPLYING WITH VARIOUS STATE AND FEDERAL LAWS AND REGULATIONS UNDER VARIOUS ENVIRONMENTAL STATUTES:

REPORTABLE QUANTITY (RQ), EPA REGULATION 40 CFR 302 (CERCLA Section 102)

The RQ for:

Benzene is 10 lbs. This product may contain up to 4.9% benzene.

Cumene is 5,000 lbs. This product may contain up to 1% cumene.

Cyclohexane is 1,000 lbs. This product may contain up to 1% cyclohexane.

Ethylbenzene is 1,000 lbs. This product may contain up to 3% ethylbenzene.

Methyl-tertiary-butyl ether is 1 lb. This product may contain up to 16% methyl-tertiary-butyl ether.

Naphthalene is 100 lbs. This product may contain up to 1% naphthalene.

Toluene is 1,000 lbs. This product may contain up to 20% toluene.

Xylene is 1,000 lbs. This product may contain up to 10% xylene.

THRESHOLD PLANNING QUANTITY (TPQ), EPA REGULATION 40 CFR 355 (SARA Sections 301-304)

No TPQ for product or any constituent greater than 1% or 0.1% (carcinogen).

TOXIC CHEMICAL RELEASE REPORTING, EPA REGULATION 40 CFR 372 (SARA Section 313)

This product may contain:

Up to 4.9% benzene.

Up to 1% cumene.

Up to 1% cyclohexane.

Up to 3% ethylbenzene.

Up to 16% methyl-tertiary-butyl ether.

Up to 1% naphthalene.

Up to 20% toluene.

Up to 10% xylene.

HAZARDOUS CHEMICAL REPORTING, EPA REGULATION 40 CFR 370 (SARA Sections 311-312)

EPA HAZARD	Acute	Chronic	Fire	Pressure	Reactive	Not
CLASSIFICATION CODE:	Hazard	Hazard	Hazard	Hazard	Hazard	Applicable
	XXX	XXX	XXX			

## I. PROTECTION AND PRECAUTIONS

### VENTILATION

Use only with ventilation sufficient to prevent exceeding recommended exposure limit or buildup of explosive concentrations of vapor in air. No smoking, or use of flame or other ignition sources.

### RESPIRATORY PROTECTION

Use supplied-air respiratory protection in confined or enclosed spaces, if needed.

### PROTECTIVE GLOVES

Use chemical-resistant gloves, if needed, to avoid prolonged or repeated skin contact.

### EYE PROTECTION

Use splash goggles or face shield when eye contact may occur.

### OTHER PROTECTIVE EQUIPMENT

Use chemical-resistant apron or other impervious clothing, if needed, to avoid contaminating regular clothing, which could result in prolonged or repeated

skin contact.

#### WORK PRACTICES / ENGINEERING CONTROLS

Keep containers closed when not in use. Do not store near heat, sparks, flame or strong oxidants. Adequate ventilation required sufficient to prevent exceeding recommended exposure limit or buildup of explosive concentrations of vapor in air. Tanks that have been in leaded gasoline service may have lead-containing residue. Special precautions needed in cleaning. See American Petroleum Institute publications 2013, 2015 and 2015A. No smoking, flame or other ignition sources.

To minimize fire or explosion risk from static charge accumulation and discharge, effectively ground product transfer system in accordance with the National Fire Protection Association standard for petroleum products.

For use as a motor fuel only. Do not use as a cleaning solvent, or thinner, or for other non-motor fuel uses. Do not siphon by mouth. Minute amounts of liquid gasoline aspirated into the lungs may cause potentially fatal chemical pneumonitis.

In order to prevent fire or explosion hazards, use appropriate equipment. Information on electrical equipment appropriate for use with this product may be found in the latest edition of the National Electrical Code (NFPA-70).

This document is available from the National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269.

#### PERSONAL HYGIENE

Minimize breathing vapor or mist. Avoid prolonged or repeated contact with skin. Remove contaminated clothing; launder or dry-clean before re-use. Remove contaminated shoes and thoroughly clean and dry before re-use. Cleanse skin thoroughly after contact, before breaks and meals, and at end of work period. Product is readily removed from skin by waterless hand cleaners followed by washing thoroughly with soap and water.

## J. TRANSPORTATION AND OSHA RELATED LABEL INFORMATION

#### TRANSPORTATION INCIDENT INFORMATION

For further information relative to spills resulting from transportation incidents, refer to latest Department of Transportation Emergency Response Guidebook for Hazardous Materials Incidents.

#### U.S. DOT HAZARDOUS MATERIALS SHIPPING DESCRIPTION

Gasoline, 3, UN 1203, II

#### OSHA REQUIRED LABEL INFORMATION

In compliance with hazard and right-to-know requirements, where applicable OSHA Hazard Warnings may be found on the label, bill of lading or invoice accompanying this shipment.

**DANGER!**

**EXTREMELY FLAMMABLE**  
**LONG-TERM, REPEATED EXPOSURE MAY CAUSE**  
**CANCER, BLOOD AND NERVOUS SYSTEM DAMAGE**  
**CONTAINS: BENZENE**

Note: Product label may contain non-OSHA related information also.

The information and recommendations contained herein are, to the best of Exxon's knowledge and belief, accurate and reliable as of the date issued. Exxon does not warrant or guarantee their accuracy or reliability, and Exxon shall not be liable for any loss or damage arising out of the use thereof.

The information and recommendations are offered for the user's consideration and examination, and it is the user's responsibility to satisfy itself that they are suitable and complete for its particular use. If buyer repackages this product, legal counsel should be consulted to insure proper health, safety and other necessary information is included on the container.

The Environmental Information included under Section H hereof as well as the Hazardous Materials Identification System (HMIS) and National Fire Protection Association (NFPA) ratings have been included by Exxon Company, U.S.A. in order to provide additional health and hazard classification information. The ratings recommended are based upon the criteria supplied by the developers of these rating systems, together with Exxon's interpretation of the available data.

FOR LUBRICANTS TECHNICAL ASSISTANCE CALL: 1-800-443-9966

FOR FUELS TECHNICAL ASSISTANCE CALL: 713-656-5827

FOR AN MSDS OR ASSISTANCE WITH AN MSDS, DIRECT INQUIRIES TO THE ADDRESS BELOW OR CALL:

MARKETING TECHNICAL SERVICES

EXXON COMPANY, U.S.A.

ROOM 2355

P. O. BOX 2180

HOUSTON, TX 77252-2180

(713) 656-5949

→

EXXON COMPANY, U.S.A.  
A DIVISION OF EXXON CORPORATION

EXXON PLUS GASOLINE

DATE ISSUED: 09/15/93  
SUPERSEDES DATE: 09/11/92

## MATERIAL SAFETY DATA SHEET

EXXON COMPANY, U. S. A. P. O. BOX 2180 HOUSTON, TX 77252-2180

### A. IDENTIFICATION AND EMERGENCY INFORMATION

PRODUCT NAME  
EXXON PLUS GASOLINE

PRODUCT CODE  
020000 - 00250

PRODUCT CATEGORY  
Motor Gasoline

PRODUCT APPEARANCE AND ODOR  
Clear colored liquid (typically orange)  
Gasoline hydrocarbon odor

MEDICAL EMERGENCY TELEPHONE NUMBER  
(713) 656-3424

### B. COMPONENTS AND HAZARD INFORMATION

COMPONENTS	CAS NO. OF COMPONENTS	APPROXIMATE CONCENTRATION
------------	--------------------------	------------------------------

Product is a variable complex mixture of components, principally hydrocarbons, blended to performance, rather than chemical specifications and typically contains the following:

Naphtha (petroleum), light catalytic cracked	64741-55-5	
--	------------	--

Naphtha (petroleum), heavy catalytic cracked	64741-54-4	
--	------------	--

Naphtha (petroleum), full-range reformed	68919-37-9	
--	------------	--

Naphtha (petroleum), full-range alkylate	64741-64-6	
--	------------	--

Naphtha (petroleum), sweetened	64741-87-3	
--------------------------------	------------	--

Butane	106-97-8	
--------	----------	--

Proprietary additives	Proprietary	
-----------------------	-------------	--

It may include varying amounts of the following identifiable components:

Benzene	71-43-2	0-4.9%
---------	---------	--------

Cumene	98-82-8	0-1%
--------	---------	------

Cyclohexane	110-82-7	0-1%
-------------	----------	------

Ethylbenzene	100-41-4	0-3%
--------------	----------	------

Naphthalene	91-20-3	0-1%
-------------	---------	------

Normal hexane	110-54-3	0-3%
---------------	----------	------

Toluene	108-88-3	0-20%
---------	----------	-------

Xylene	1330-20-7	0-10%
--------	-----------	-------

It may also include varying amounts of oxygenates such as the following:

Ethanol	64-17-5	0-10%
---------	---------	-------



Ethyl-tertiary-butyl ether	637-92-3	0-18.5%
Methyl-tertiary-butyl ether	1634-04-4	0-16%
Tertiary-amyl-methyl-ether	994-05-8	0-18.5%

All components of this product are listed on the U.S. TSCA inventory.  
See Section E for Health and Hazard Information.  
See Section H for additional Environmental information.

#### HAZARDOUS MATERIALS IDENTIFICATION SYSTEM (HMIS)

Health	Flammability	Reactivity	BASIS
1	3	0	Recommended by Exxon
EXPOSURE LIMIT FOR TOTAL PRODUCT			BASIS
100 ppm (300 mg/m <sup>3</sup> ) for an 8-hour workday			Recommended by Exxon. OSHA Regulation 29 CFR 1910.1000 and the American Conference of Governmental Industrial Hygienists (ACGIH) list Threshold Limit Values (TLV) of 300 ppm (900 mg/m <sup>3</sup> ) for gasoline for an 8-hour workday; 500 ppm (1500 mg/m <sup>3</sup> ) STEL.
50 ppm (187 mg/m <sup>3</sup> ) for toluene (skin) for an 8-hour workday			Recommended by the American Conference of Governmental Industrial Hygienists (ACGIH)
50 ppm (180 mg/m <sup>3</sup> ) for methyl-tertiary-butyl ether for a 15 minute STEL			Recommended by Exxon
The airborne benzene level shall not exceed 1 ppm for an 8-hour workday; 5 ppm STEL			OSHA Regulation 29 CFR 1910.1028

### C. PRIMARY ROUTES OF ENTRY AND EMERGENCY AND FIRST AID PROCEDURES

#### EYE CONTACT

If splashed into the eyes, flush with clear water for 15 minutes or until irritation subsides. If irritation persists, call a physician.

#### SKIN

In case of skin contact, remove any contaminated clothing and wash skin with soap and water. Launder or dry-clean clothing before reuse. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

#### INHALATION

If overcome by vapor, remove from exposure and call a physician immediately. If breathing is irregular or has stopped, start resuscitation, administer oxygen, if available.

#### INGESTION

If ingested, DO NOT induce vomiting; call a physician immediately.

### D. FIRE AND EXPLOSION HAZARD INFORMATION

## UNUSUAL FIRE AND EXPLOSION HAZARD

EXTREMELY FLAMMABLE VAPORS CAN TRAVEL AND EXPLODE

### FLASH POINT (MINIMUM)

FLAMMABLE - Per DOT 49 CFR 173.120  
Approximately -38°C (-36°F)

### AUTOIGNITION TEMPERATURE

Approximately 456°C (853°F)  
National Fire Protection  
Association's Guide on  
Hazardous Materials

### NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) - HAZARD IDENTIFICATION

Health Flammability Reactivity

1

3

0

#### BASIS

Recommended by the National Fire  
Protection Association

### HANDLING PRECAUTIONS

This liquid is volatile and gives off invisible vapors. Either the liquid or vapor may settle in low areas or travel some distance along the ground or surface to ignition sources where they may ignite or explode. Keep product away from ignition sources, such as heat, sparks, pilot lights, static electricity, and open flames.

### FLAMMABLE OR EXPLOSIVE LIMITS (APPROXIMATE PERCENT BY VOLUME IN AIR)

Estimated values: Lower Flammable Limit 1.4% Upper Flammable Limit 7.6%

### EXTINGUISHING MEDIA AND FIRE FIGHTING PROCEDURES

Foam, water spray (fog), dry chemical, carbon dioxide and vaporizing liquid type extinguishing agents may all be suitable for extinguishing fires involving this type of product, depending on size or potential size of fire and circumstances related to the situation. Plan fire protection and response strategy through consultation with local fire protection authorities or appropriate specialists.

The following procedures for this type of product are based on the recommendations in the National Fire Protection Association's "Fire Protection Guide on Hazardous Materials", Tenth Edition (1991):

Use dry chemical, foam or carbon dioxide to extinguish the fire. Water may be ineffective, but water should be used to keep fire-exposed containers cool. If a leak or spill has ignited, use water spray to disperse the vapors and to protect men attempting to stop a leak. Water spray may be used to flush spills away from exposures. Minimize breathing of gases, vapor, fumes or decomposition products. Use supplied-air breathing equipment for enclosed or confined spaces or as otherwise needed.

NOTE: The inclusion of the phrase "water may be ineffective" is to indicate that although water can be used to cool and protect exposed material, water may not extinguish the fire unless used under favorable conditions by experienced fire fighters trained in fighting all types of flammable liquid fires.

### DECOMPOSITION PRODUCTS UNDER FIRE CONDITIONS

Fumes, smoke, carbon monoxide, sulfur oxides, aldehydes and other decomposition products, in the case of incomplete combustion.

### "EMPTY" CONTAINER WARNING

"Empty" containers retain residue (liquid and/or vapor) and can be dangerous. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. Do not attempt to clean

since residue is difficult to remove. "Empty" drums should be completely drained, properly bunged and promptly returned to a drum reconditioner. All other containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. For work on tanks refer to Occupational Safety and Health Administration regulations, ANSI Z49.1, and other governmental and industrial references pertaining to cleaning, repairing, welding, or other contemplated operations.

## E. HEALTH AND HAZARD INFORMATION

### VARIABILITY AMONG INDIVIDUALS

Health studies have shown that many petroleum hydrocarbons and synthetic lubricants pose potential human health risks which may vary from person to person. As a precaution, exposure to liquids, vapors, mists or fumes should be minimized.

### EFFECTS OF OVEREXPOSURE (Signs and symptoms of exposure)

High vapor concentrations (greater than approximately 1000 ppm) are irritating to the eyes and the respiratory tract, and may cause headaches, dizziness, anesthesia, drowsiness, unconsciousness, and other central nervous system effects, including death.

Prolonged or repeated liquid contact with the skin will dry and defat the skin, leading to possible irritation and dermatitis.

### NATURE OF HAZARD AND TOXICITY INFORMATION

WARNING: Concentrated, prolonged or deliberate inhalation of this product may cause brain and nervous system damage. Prolonged and repeated exposure of pregnant animals to high levels of toluene (levels greater than approximately 1500 ppm) has been reported to cause adverse fetal developmental effects.

Prolonged or repeated skin contact with this product tends to remove skin oils, possibly leading to irritation and dermatitis; however, based on human experience and available toxicological data, this product is judged to be neither a "corrosive" nor an "irritant" by OSHA criteria.

Product contacting the eyes may cause eye irritation.

This product may contain up to a maximum of 4.9 weight percent benzene, CAS # 71-43-2, as a natural constituent of various gasoline blend components. Benzene can cause anemia and other blood diseases, including leukemia (cancer of the blood-forming system), after prolonged or repeated exposures at high concentrations (e.g., 50-500 ppm). It has also caused fetal defects in tests on laboratory animals.

Contains light hydrocarbon components. Lifetime studies by the American Petroleum Institute have shown that kidney damage and kidney cancer can occur in male rats after prolonged inhalation exposures at elevated concentrations of total gasoline. Kidneys of mice and female rats were unaffected. The U.S. EPA Risk Assessment Forum has concluded that the male rat kidney tumor results are not relevant for humans. Total gasoline exposure also produced liver tumors in female mice only. The implication of these data for humans has not been determined. Certain components, such as normal hexane, may also affect the nervous system at high concentrations (e.g., 1000-1500 ppm).

Product has a low order of acute oral and dermal toxicity, but minute amounts aspirated into the lungs during ingestion or vomiting may cause mild to severe pulmonary injury and possibly death.

This product is judged to have an acute oral LD50 (rat) greater than 5 g/kg of body weight, and an acute dermal LD50 (rabbit) greater than 3.16 g/kg of body weight.

Inhalation of components of exhaust from burning, such as carbon monoxide, may cause death at high concentrations. Exposure to the exhaust of this fuel

should be minimized.  
PRE-EXISTING MEDICAL CONDITIONS WHICH MAY BE AGGRAVATED BY EXPOSURE  
Benzene - Individuals with liver disease may be more susceptible to toxic effects.  
Hexane - Individuals with neurological disease should avoid exposure.  
Petroleum Solvents/Petroleum Hydrocarbons - Skin contact may aggravate an existing dermatitis.

## F. PHYSICAL DATA

The following data are approximate or typical values and should not be used for precise design purposes.

### BOILING RANGE

Approximately 21°C (70°F) IBP  
to 227°C (440°F) FBP

### VAPOR PRESSURE

Varies seasonally from  
approximately 5 to 15 psi  
Reid Vapor Pressure

### SPECIFIC GRAVITY (15.6°C/15.6°C)

Approximately 0.74

### VAPOR DENSITY (AIR = 1)

Approximately 5

### MOLECULAR WEIGHT

Complex mixture, components vary  
from approximately 45 to 185

### PERCENT VOLATILE BY VOLUME

100

### pH

Essentially neutral

### EVAPORATION RATE @ 1 ATM. AND 25°C

(77°F) (n-BUTYL ACETATE = 1)  
Approximately 10-11

### POUR, CONGEALING OR MELTING POINT

Less than -38°C (-36°F)  
Pour Point by ASTM D 97

### SOLUBILITY IN WATER @ 1 ATM. AND 25°C (77°F)

Negligible; less than 0.1%

### VISCOSITY

Approximately 0.5 cSt @ 25°C

## G. REACTIVITY

This product is stable and will not react violently with water. Hazardous polymerization will not occur. Avoid contact with strong oxidants such as liquid chlorine, concentrated oxygen, sodium hypochlorite, calcium hypochlorite, etc., as this presents a serious explosion hazard.

## H. ENVIRONMENTAL INFORMATION

### STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Shut off and eliminate all ignition sources. Keep people away. Recover free product. Add sand, earth or other suitable absorbent to spill area. Minimize breathing vapors. Minimize skin contact. Ventilate confined spaces. Open all windows and doors. Keep product out of sewers and watercourses by diking or impounding. Advise authorities if product has entered or may enter sewers, watercourses, or extensive land areas.

Assure conformity with applicable governmental regulations. Continue to observe precautions for volatile, flammable vapors from absorbed material.

THE FOLLOWING INFORMATION MAY BE USEFUL IN COMPLYING WITH VARIOUS STATE AND FEDERAL LAWS AND REGULATIONS UNDER VARIOUS ENVIRONMENTAL STATUTES:

REPORTABLE QUANTITY (RQ), EPA REGULATION 40 CFR 302 (CERCLA Section 102)

The RQ for:

Benzene is 10 lbs. This product may contain up to 4.9% benzene.

Cumene is 5,000 lbs. This product may contain up to 1% cumene.

Cyclohexane is 1,000 lbs. This product may contain up to 1% cyclohexane.

Ethylbenzene is 1,000 lbs. This product may contain up to 3% ethylbenzene.

Methyl-tertiary-butyl ether is 1 lb. This product may contain up to 16% methyl-tertiary-butyl ether.

Naphthalene is 100 lbs. This product may contain up to 1% naphthalene.

Toluene is 1,000 lbs. This product may contain up to 20% toluene.

Xylene is 1,000 lbs. This product may contain up to 10% xylene.

THRESHOLD PLANNING QUANTITY (TPQ), EPA REGULATION 40 CFR 355 (SARA Sections 301-304)

No TPQ for product or any constituent greater than 1% or 0.1% (carcinogen).

TOXIC CHEMICAL RELEASE REPORTING, EPA REGULATION 40 CFR 372 (SARA Section 313)

This product may contain:

Up to 4.9% benzene.

Up to 1% cumene.

Up to 1% cyclohexane.

Up to 3% ethylbenzene.

Up to 16% methyl-tertiary-butyl ether.

Up to 1% naphthalene.

Up to 20% toluene.

Up to 10% xylene.

HAZARDOUS CHEMICAL REPORTING, EPA REGULATION 40 CFR 370 (SARA Sections 311-312)

EPA HAZARD	Acute	Chronic	Fire	Pressure	Reactive	Not
CLASSIFICATION CODE:	Hazard	Hazard	Hazard	Hazard	Hazard	Applicable
	XXX	XXX	XXX			

## I. PROTECTION AND PRECAUTIONS

### VENTILATION

Use only with ventilation sufficient to prevent exceeding recommended exposure limit or buildup of explosive concentrations of vapor in air. No smoking, or use of flame or other ignition sources.

### RESPIRATORY PROTECTION

Use supplied-air respiratory protection in confined or enclosed spaces, if needed.

### PROTECTIVE GLOVES

Use chemical-resistant gloves, if needed, to avoid prolonged or repeated skin contact.

### EYE PROTECTION

Use splash goggles or face shield when eye contact may occur.

### OTHER PROTECTIVE EQUIPMENT

Use chemical-resistant apron or other impervious clothing, if needed, to avoid contaminating regular clothing, which could result in prolonged or repeated

skin contact.

#### WORK PRACTICES / ENGINEERING CONTROLS

Keep containers closed when not in use. Do not store near heat, sparks, flame or strong oxidants. Adequate ventilation required sufficient to prevent exceeding recommended exposure limit or buildup of explosive concentrations of vapor in air. Tanks that have been in leaded gasoline service may have lead-containing residue. Special precautions needed in cleaning. See American Petroleum Institute publications 2013, 2015 and 2015A. No smoking, flame or other ignition sources.

To minimize fire or explosion risk from static charge accumulation and discharge, effectively ground product transfer system in accordance with the National Fire Protection Association standard for petroleum products.

For use as a motor fuel only. Do not use as a cleaning solvent, or thinner, or for other non-motor fuel uses. Do not siphon by mouth. Minute amounts of liquid gasoline aspirated into the lungs may cause potentially fatal chemical pneumonitis.

In order to prevent fire or explosion hazards, use appropriate equipment. Information on electrical equipment appropriate for use with this product may be found in the latest edition of the National Electrical Code (NFPA-70).

This document is available from the National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269.

#### PERSONAL HYGIENE

Minimize breathing vapor or mist. Avoid prolonged or repeated contact with skin. Remove contaminated clothing; launder or dry-clean before re-use. Remove contaminated shoes and thoroughly clean and dry before re-use. Cleanse skin thoroughly after contact, before breaks and meals, and at end of work period. Product is readily removed from skin by waterless hand cleaners followed by washing thoroughly with soap and water.

## J. TRANSPORTATION AND OSHA RELATED LABEL INFORMATION

#### TRANSPORTATION INCIDENT INFORMATION

For further information relative to spills resulting from transportation incidents, refer to latest Department of Transportation Emergency Response Guidebook for Hazardous Materials Incidents.

#### U.S. DOT HAZARDOUS MATERIALS SHIPPING DESCRIPTION

Gasoline, 3, UN 1203, II

#### OSHA REQUIRED LABEL INFORMATION

In compliance with hazard and right-to-know requirements, where applicable OSHA Hazard Warnings may be found on the label, bill of lading or invoice accompanying this shipment.

**DANGER!**

**EXTREMELY FLAMMABLE**  
**LONG-TERM, REPEATED EXPOSURE MAY CAUSE**  
**CANCER, BLOOD AND NERVOUS SYSTEM DAMAGE**  
**CONTAINS: BENZENE**

Note: Product label may contain non-OSHA related information also.

The information and recommendations contained herein are, to the best of Exxon's knowledge and belief, accurate and reliable as of the date issued. Exxon does not warrant or guarantee their accuracy or reliability, and Exxon shall not be liable for any loss or damage arising out of the use thereof.

The information and recommendations are offered for the user's consideration and examination, and it is the user's responsibility to satisfy itself that they are suitable and complete for its particular use. If buyer repackages this product, legal counsel should be consulted to insure proper health, safety and other necessary information is included on the container.

The Environmental Information included under Section H hereof as well as the Hazardous Materials Identification System (HMIS) and National Fire Protection Association (NFPA) ratings have been included by Exxon Company, U.S.A. in order to provide additional health and hazard classification information. The ratings recommended are based upon the criteria supplied by the developers of these rating systems, together with Exxon's interpretation of the available data.

FOR LUBRICANTS TECHNICAL ASSISTANCE CALL: 1-800-443-9966

FOR FUELS TECHNICAL ASSISTANCE CALL: 713-656-5827

FOR AN MSDS OR ASSISTANCE WITH AN MSDS, DIRECT INQUIRIES TO THE ADDRESS BELOW OR CALL:

MARKETING TECHNICAL SERVICES  
EXXON COMPANY, U.S.A.  
ROOM 2355  
P. O. BOX 2180  
HOUSTON, TX 77252-2180  
(713) 656-5949

**APPENDIX B**

**FIELD PROTOCOL**



**Environmental Resolutions, Inc.**  
**Air Sparging/Soil Vapor Extraction (AS/SVE) Well Installation**  
**Field Protocol**

**Preliminary Activities**

Prior to the onset of drilling activities at the site, ERI obtains a well construction permit from the appropriate agency. Advance notification is made as required by the appropriate governing agency at least one week prior to the start of work. ERI contacts Underground Services Alert at least 48 hours prior to the start of work to mark buried utilities. Prior to drilling, the well borehole location is cleared in accordance with the client's procedures for utility clearance of boreholes. The fieldwork is conducted under the updated site-specific safety plan prepared for this project, which is available at the job site during field activities.

**AS/SVE Well Installation and Soil Sampling Procedures**

The borehole is advanced with a hollow-stem auger. ERI collects discrete soil samples from the borehole at the capillary fringe and at 5-foot intervals using a California split-spoon sampler containing three 6-inch long brass sleeves. The borehole is advanced to just above the desired sampling depth. The sampler is then placed inside the auger and driven through the center of the auger to a depth of 18 inches past the bit of the auger. The sampler is driven into the soil with a standard 140-pound hammer repeatedly dropped from a height of 30 inches onto the sampler. The number of blows required to drive the sampler each 6-inch increment is recorded on the boring log. The blow count information is recorded for use in evaluating the lithology at the site. The sampler is then retrieved from the borehole. The brass sleeves are removed from the sample barrel, and the lower-most sample sleeve is immediately sealed with Teflon™ tape, capped, and transported to a State of California-certified laboratory. The samples are transferred under proper chain-of-custody protocol. An ERI geologist describes the soil encountered during the assessment according to the Unified Soil Classification System and records the description on the boring log.

**Field Screening Procedures**

ERI performs a field evaluation for concentrations of volatile fuel constituents in the soil samples collected during the assessment. ERI places the contents of the middle brass sleeve into a plastic re-sealable bag. The bag is placed away from direct sunlight for approximately 20 minutes. After approximately 20 minutes, the tip of a Microtip photo-ionization detector (PID) calibrated to 50 parts per million hexane is inserted through the plastic bag to measure organic vapor concentrations in the headspace. The PID measurements are recorded on the boring log. Instruments such as the PID are useful for evaluating relative concentrations of volatilized hydrocarbons, but they do not measure the concentration of petroleum hydrocarbons in the soil matrix with the same precision as laboratory analysis.

**AS/SVE Well Construction**

For a detailed, site-specific description of the AS/SVE well construction, please refer to the main document.

**Decontamination Procedures**

ERI decontaminates soil and water sampling equipment between each sampling event with a non-phosphate solution, followed by tap water and de-ionized water rinses. Downhole drilling equipment is steam-cleaned prior to drilling the borehole and at completion of the borehole.

**Waste Treatment and Soil Disposal**

Soil cuttings generated from the drilling of the borehole are stored on site in properly labeled, Department of Transportation-approved, 55-gallon drums. The soil is removed from the site and transported to a client-approved recycling facility for disposal. Decontamination fluids and purge water from well development and sampling activities are stored on site in 55-gallon drums and subsequently treated at a client-approved recycling facility or with a permitted mobile carbon treatment system. The system operates under a national pollution discharge elimination system permit.